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TRANSP

HISTORY

of the work of eliminating
grade crossings . . .

BY THE

Brooklyn Grade Crossing Commission

A joint undertaking between

THE CITY OF NEW YORK

THE LONG ISLAND R. R. CO.

AND

THE BROOKLYN HEIGHTS R. R. CO.

April 30, 1918

BROOKLYN GRADE CROSSING COMMISSION

COMMISSIONERS

FRANK M. BROOKS, President

JOHN S. GRIFFITH, Secretary

EDWIN C. SWEZEY, General Superintendent

RALPH PETERS, Representing L. I. R. R.

JOHN L. WELLS, Representing B. H. R. R.

FORMER MEMBERS

LOUIS BEER, resigned April, 1904; JOHN C. BRACKENRIDGE, resigned December 29th, 1903 and WILLIAM F. POTTER, President, Long Island Railroad Company, died April 3rd, 1905.

BROOKLYN GRADE CROSSING COMMISSION

THE BROOKLYN GRADE CROSSING COMMISSION was created by an act of the Legislature, which became a law May 9, 1903, entitled as follows: "Chap. 507, an Act to abolish certain grade crossings of highways and railroads in the borough of Brooklyn in the city of New York and county of Kings, and providing for necessary changes in the grades of highways, streets and avenues, and of portions of the railroad, and right of way of the New York, Brooklyn and Manhattan Beach railway company, leased to the Long Island railroad company, and of the Brooklyn Union elevated railroad company, leased to the Brooklyn Heights railroad company, so as to abolish present and avoid future crossings at grade, and providing means for the payment for such alterations or changes."

The act authorized the Mayor of the City of New York, (Hon. Seth Low) to appoint a Commission of five, three of whom should represent the City, one to represent the Long Island Railroad Company, and one to represent the Brooklyn Heights Railroad Company, for the purpose of carrying out the provisions of the act above referred to.

The Mayor appointed, June 29, 1903, as members of the Commission, Louis Beer, Frank M. Brooks and Edwin C. Swezey, representing the City, John C. Brackenridge, representing the Brooklyn Heights Railroad Company and William F. Potter, representing the Long Island Railroad Company.

The first meeting of the Commission was held at the office of the Borough President, July 9, 1903, at which an organization was effected by electing the following officers:

Louis Beer, president; Frank M. Brooks, secretary; Edwin C. Swezey, general superintendent. Mr. Brackenridge resigned December 29, 1903, and was succeeded by John L. Wells, appointed January 6, 1904. Mr. Beer resigned April, 1904, and

was succeeded by John S. Griffith, appointed May 3, 1904. The death of Mr. Potter occurred April 3, 1905, and he was succeeded by Ralph Peters, appointed April 24, 1905.

These changes in the membership of the Commission resulted in its reorganization by electing Frank M. Brooks, president, John S. Griffith, secretary, and under the Board as thus constituted, the work thus far accomplished on both Improvements, has been carried on.

The act of the Legislature stated that the work contemplated affecting the Long Island Railroad Company should be designated as the Bay Ridge Improvement, and that the work contemplated affecting the Brooklyn Heights Railroad Company should be designated as the Brighton Beach Improvement, and as the two Improvements were distinct from each other, it became necessary for the Board to organize two separate forces to carry on the Improvements.

The Board appointed Mr. Lardner V. Morris, Chief Engineer of the Bay Ridge Improvement, and Mr. John H. Dwyer, Chief Engineer of the Brighton Beach Improvement.

Because of the division of the work the report of this Board showing the progress made will deal with each Improvement under separate headings.

As the work of eliminating grade crossings by depressing or elevating the railroads would affect the abutting property and also the property abutting on the intersecting streets, it became necessary from time to time to grant public hearings to citizens interested therein, also to consider petitions covering certain specified requests to protect as far as possible the interests of the residents and property owners affected by the proposed changes and also to consider the future development of what was at the time of the beginning of the work undeveloped territory.

As the original act was passed without a thorough knowledge of the requirements in this regard, the Commission after carefully investigating the many interests involved felt justified in advocating at different times amendments to the act by the Legislature. Said amendments became Laws on the following dates:

Chapter 603 became a law on May 4, 1904, and provided for the constructing of bridges for streets not yet opened across

the right of way of the Long Island Railroad, but which will be needed when the adjacent territory becomes more populated. This amendment also provided that the cost of these bridges need not be charged against the \$2,500,000 originally appropriated by the City for the Bay Ridge Improvement.

Chapter 589 became a law on May 19, 1905, and amended the original act to the effect that the right of way of the Long Island Railroad should continue in a depression under Flatbush avenue easterly to a point between Albany avenue and Avenue G. The original act provided for the elevation of the Railroad between these points.

Chapter 635 became a law on May 26, 1905, and provided that if in the judgment of the Commission the cost of acquiring land for the construction of slopes is less than the cost of constructing retaining walls for the purpose of sustaining the embankments, the Board may adopt that method of construction; also provided an increase in the amount to be appropriated by the City for the Brighton Beach Improvement from \$750,000 to \$1,000,000; also provided for the construction of bridges over streets not yet legally opened of the Brighton Beach Improvement; also conferred power upon the Commission to settle claims for damages to improved property abutting on streets, the grade of which has been changed for the purpose of this Improvement.

Chapter 735 became a law on July 25, 1907, and provided for the re-location of the tracks of the Long Island Railroad Company between East New York avenue and a point near Bushwick avenue and Aberdeen street; also provided for a method of procedure in ascertaining the damages to improved property caused by changing grade of streets affected by the Improvements.

The progress reports herein printed give a history of the work in detail. The time for completion of the Bay Ridge Improvement of the Long Island Railroad extended beyond the time expected when the work was begun. This was due to financial conditions, requiring a temporary suspension of large expenditures until such time as the City and the Railroad Company were prepared to proceed.

Owing to the Act creating the Commission failing to provide for terminating its existence and preserving its rec-

ords,—the Commission in co-operation with the City Authorities joined in asking the action of the State Legislation to that end.

The Legislative Act provided for the transfer of the duties of the Commission to the Board of Estimate and Apportionment, and the filing of all its records and maps with the County Clerk of Kings County and the termination on May 1st, 1918, of the existence of the Brooklyn Grade Crossing Commission.

BRIGHTON BEACH IMPROVEMENT

FIRST PROGRESS REPORT

1903-1907

The Brighton Beach Improvement comprehended the elimination of the grade crossings of the steam road constructed in 1878, called the Brooklyn, Flatbush and Coney Island Railroad, but popularly known as the Brighton Beach Railroad, which was built in conjunction with the development of the Brighton Beach Hotel and adjacent property.

The road began at Franklin avenue and Atlantic avenue in the City of Brooklyn, running South to the Brooklyn City line for a distance of one mile, and from the Brooklyn City line extending through the villages of Flatbush, Greenfield and Sheepshead Bay, within the towns of Flatbush and Gravesend, making the total length of the road 7 miles.

When the road was constructed the territory above mentioned consisted mainly of farm land, and the Brooklyn, Flatbush and Coney Island Railroad Company purchased its right-of-way, owning the same outright.

The great increase in population and growth of the City of Brooklyn extending into the suburbs resulted in a movement on the part of the residents to the end that all the territory adjacent to this Railroad, became in 1894 a part of the City of Brooklyn, and on January 1, 1898, became a part of the City of New York.

By this time this section had reached a period of active development with a rapidly increasing population.

The Brighton Beach Road was acquired by the Brooklyn Union Elevated Railroad Company in May, 1899, a connection having been made with the elevated railroad system at Franklin avenue and Fulton street a few years prior to this.

The electrification of the road immediately followed, which enabled passengers to be carried to the City Hall in Manhattan.

The extension of population along the line of the Brighton Beach Road and adjacent thereto, was so great and the quick time made from the heart of the City to Coney Island resulted in such a great increase in traffic, that the running of motor

trains became a source of danger to the residents, and it was deemed advisable by the city officials to co-operate with the Railroad Company in the elimination of all grade crossings existing at that time and to avoid future crossings at grade.

Under the terms of the original act of the Legislature, the City was required to pay one-half of the cost of the work, the total payment on the part of the City, however, not to exceed an amount of \$750,000. The amendment to the act Chapter 635, Laws of 1905, increased the total amount which could be paid by the City to \$1,000,000.

Immediately upon the organization of the Commission it acquired from the Railroad Company preliminary surveys, maps and plans and after reviewing same the Commission decided to divide the work of the Brighton Beach Improvement into three sections.

The first section consisted of the separation of the grade of the railroad from the grade of the street at Park place and Prospect place, by elevating the railroad.

The second section consisted of depressing the tracks of the Brighton Beach Road from a point about 300 feet south of Church avenue to a point about 450 feet South of Avenue G, making of total length of Section No. 2 of 6,400 feet.

This depression was in the form of an open cut.

Section No. 3 began at the terminus of Section No. 2 and was in the form of an embankment, extending to Neptune avenue, and from that point running to grade at about 880 feet, making the total distance of Section No. 3 18,800 feet.

At the time of the preparation of this preliminary report, the work of the Brighton Beach Improvement on all three sections has been completed sufficiently to operate all trains over the new grade.

The work has been carried on with great rapidity, the accomplishment of which has required the most faithful and energetic efforts on the part of the officials of the Board and its engineering staff. The Board desires to acknowledge the energetic co-operation of Mr. E. W. Winter, President and Mr. W. S. Menden, Chief Engineer of the Brooklyn Heights R. R. Co., in the securing of these results.

SECTION No. 1.

The work of Section No. 1 was the first attempted.

The two grade crossings at Park place and Prospect place were particularly dangerous, owing to the large and steadily increasing population adjacent to the Park place station.

Plans were filed with the Commissioner of Public Works as required by Law on June 28, 1904.

Bids for the work were opened and contracts awarded on July 22 and 26, 1904.

The work on Section No. 1 consisted of the depression of the roadway of Park place eight (8) feet below the established grade where it crossed the railroad.

The changed grade extended 240 feet to the West and 133 feet to the East of the railroad, at which points it comes to the established grade of the street.

The track of the railroad was elevated upon a steel structure 6 feet above the old street grade, giving with the depression of the street a headroom of 12 feet between the railroad and the street.

The change of grade at Prospect place was effected by elevating the railroad on a steel structure to a point which allowed a headroom of 12 feet between the railroad and the street.

In making the arrangement for carrying on this work it became necessary to provide for the maintenance of traffic, which during the rush hours morning and evening and during the Coney Island season is particularly heavy.

A somewhat complicated situation was created because of the limited right-of-way, and the problems to be solved were many in order to facilitate the progress of the work and at the same time maintain uninterrupted traffic.

Contracts were drawn and the work organized and carried on with this object in mind, however, and it is a matter of great credit to the Chief Engineer that the entire work of Section No. 1 was completed and the new station erected without injury to any of those employed on the work or to the traveling public and without any interruption in the exceedingly heavy traffic of the road.

Brighton Beach Improvement

The following contracts were made covering the work at Prospect place and Park place (Section No. 1).

CRANFORD CONSTRUCTION COMPANY.

For excavation of street to lower the grade, building of drainage sewer, construction of concrete walls to maintain sidewalks at higher grade than roadway and construction of walls and abutments to elevate the railroad, for erection of fencing on sidewalks along depressed roadway, repaving depressed roadway and reflagging sidewalk.

Contract awarded July 22, 1904.

Cost of work.....\$40,439.00

Amount of concrete used, 2,600 cubic yards.

Amount of material excavated, 5,200 cubic yards.

Lineal feet of fence, 1,090 feet.

Pavement laid, Medina sandstone, 1,450 square yards.

“ “ Asphalt pavement, 313 square yards.

Sidewalk laid, 7,030 feet.

Granite curbing, 700 lineal feet.

McCLINTIC MARSHALL CONSTRUCTION COMPANY.

Contract for raising and reinforcing spans of elevated structure at and near St. Marks avenue and construction of new bridges over Prospect place and Park place.

Contract awarded July 22, 1904.

Weight of Prospect place bridge, 43.5 tons.

Weight of Park place bridge, 50.8 tons.

Cost of raising and reinforcing elevated structure at St. Marks avenue, \$2,800.00.

Total amount of contract..... 9,939.00

EASTERN CONSTRUCTION COMPANY.

Contract for the erection and removal of temporary inclines for the purpose of maintaining traffic during construction of permanent work from St. Marks avenue to Prospect place.

Contract awarded July 26, 1904.

Total amount of contract..... 5,603.00

Brighton Beach Improvement

MILLIKEN BROTHERS.

Contract for building new station platform and canopy.

Contract awarded July 22, 1904.

Cost of same.....	4,243.00
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BROOKLYN HEIGHTS RAILROAD COMPANY.

Paid for work on temporary and permanent tracks, overhead line changes, right-of-way fences and incident work.....	10,959.00
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SUNDRY EXPENSES.

Making changes in water mains in Park place....	1,109.00
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Incidental expenses, printing, rent of land, inspection, etc.....	645.00
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\$72,937.00

In addition to the above cost there will have to be included any award for damages owing to the changing of grade of the property abutting at Park place, claims for which are now in process of settlement.

The work on this section necessitated the erection of a new station at Park place by the railroad company at an expense of \$3,100, including station building, lighting, wiring, etc.

SECTION No. 2.

The work of Section No. 2 consisted of the separation of the grade of the railroad from the grade of the street at Beverly Road, Avenue C, Avenue D, Ditmas Avenue, Newkirk Avenue and Foster Avenue by depressing the right-of-way of the railroad, beginning at a point 300 feet south of Church Avenue and continuing to a point about 450 feet south of Avenue G, a total length of 6,400 feet.

The determination of the Commission to depress the right-of-way on this section was reached after a lengthy consideration of the matter, necessitated by the desire of the Railroad Company to elevate its right-of-way.

The Commission received numerous protests from many associations and residents adjacent to the Brighton Beach Rail-

road against the elevation of the road, and in order to give the Railroad Company the full use of its entire right-of-way, nearly all of the property owners adjacent to the railroad agreed to give the Railroad Company, in consideration of the road being depressed, an easement to sufficient of their property for the purpose of constructing retaining walls to hold up the sides of the cut.

In reaching this result the Commission acknowledges the assistance of the Committee of One Hundred, consisting of residents of Flatbush organized for the purpose of consulting with the Commission as to the nature of the work to be accomplished at this point.

The Commission also gave hearings to representatives of the Germania Real Estate and Improvement Company, and to the following gentlemen representing various organizations and property interest: F. A. M. Burrell, Chairman, Committee of One Hundred; Hon. E. M. Bassett, L. H. Pounds, T. B. Ackerson, E. P. Maynard, Engineer O. F. Nichols, Hon. George E. Waldo, Dr. G. W. Brush, G. P. Fiske, H. A. Meyer, H. B. Bullard, George Maynard, George T. Haight, J. A. Davidson, Charles E. Bolles.

The Commission voted to depress the right-of-way on the 10th day of March, 1905. Plans were filed with the City Clerk on the 21st day of March, 1905.

Briefly stated the work of Section No. 2 included:

(a) The construction of a 36-inch sewer 1,350 feet long from Church avenue and the railroad cut, through East 18th street to Beverly Road, for the purpose of carrying off the drainage running into the cut north of Church avenue, and to prevent it entering into the proposed new depression.

(b) The construction of a 36-inch sewer 5,800 feet long running from the railroad cut East through Newkirk avenue extending to Rogers avenue, thence south to Flatbush avenue and then into the Avenue F main sewer, for the purpose of carrying off the drainage of the proposed new cut.

(c) The cutting of a new roadbed 18 feet below the old roadbed, the sides of the cut to be retained by concrete walls.

(d) The construction of new station buildings at Beverly Road, Avenue C and Newkirk avenue.

(e) The construction of steel highway bridges over railroad cut at all intersecting streets, and also foot bridges at Albemarle Road and Avenue G.

(f) The erection of 13,600 feet iron fence on retaining walls.

(g) The construction of the Foster avenue sewer to allow for lowering the roadbed of the railroad.

Bids for the construction of the East 18th street sewer were opened and contract awarded on May 16, 1905, to Henry Dumary.

Bids for the construction of the Newkirk avenue sewer were opened and contract awarded on June 6, 1905, to Henry Dumary.

Bids for the excavation of the proposed cut and for the construction of concrete retaining walls were opened and contract awarded on November 8, 1905, to Charles Cranford.

Bids for the construction of new station buildings were let by the Brooklyn Heights Railroad Company to Thomas G. Carlin on February 25, 1907.

Bids for the construction of new steel highway bridges were opened and contract awarded on February 6, 1906, to Milliken Brothers.

Bids for the erection of iron fence were opened and contract awarded on February 9, 1906, to Wayne Iron Works.

The plans also provided for the construction of drainage sewers for the cut, for the construction of conduits in the retaining walls for holding the cables necessary for the transmission of the electrical power to operate the railroad, and also for the replacing of city sewers at cross streets.

In the drawing of the contract provision was made for the maintenance of the usual passenger traffic of the railroad, and rules and regulations were imposed on the contractor to safeguard as much as possible the safety of the traveling public, and the cross street traffic and the property of adjacent property owners.

Owing to the depth of the cut and the limited space for the work of construction and excavation, extraordinary care and

foresight was required by the Chief Engineer in the drawing up of the contract and the requirements of the same, so as to facilitate and maintain passenger and cross street traffic and at the same time to allow the contractor to proceed with his work uninterruptedly.

This necessitated the construction at various points of temporary cross overs and overhead electric equipment, temporary tracks and temporary bridges at cross streets.

The Commission was required to arrange for the taking up of trees and shrubs on the ground to be disturbed immediately adjacent to the cut, to transplant and care for the same during the progress of the work and to retransplant upon the completion of the work to the original location.

The excavation of the cut was begun in March, 1906, and finished in July, 1907, the total amount of material excavated being 230,000 yards.

It is a matter of gratification to the Board to include in its report the statement that, during the progress of this work under many adverse conditions existing because of limited space available for the simultaneous prosecution of the work and operation of the railroad, the passenger traffic was maintained on its regular schedule, including the heavy traffic of two summer seasons, without injury to the traveling public.

The material excavated on Section No. 2 was hauled on the Brighton Beach Railroad south to Section No. 3 to form the embankment planned at that section.

The work on the cut was begun December 29, 1905, at Avenue G, for the construction of the west concrete wall.

The excavation for the depressed roadbed began at and followed the construction of this wall, said excavation consisting of about one-third of the width of the entire cut.

After the west wall was completed the east wall was begun at the Church avenue end of this section and as the east wall progressed it was followed by the excavation of the remaining portion of the cut.

The west wall was completed in October, 1906, and the east wall was completed in August, 1907.

Railroad traffic was maintained along the easterly side of

Brighton Beach Improvement

the right-of-way until the west wall and the excavation adjacent thereto was completed, when tracks were laid in the new excavation and trains operated thereon while the east wall and the excavation of the remainder of the cut were being completed.

The following contracts were made covering the work of Section No. 2, Brighton Beach Railroad.

CHARLES CRANFORD.

For lowering the right-of-way of the railroad, construction of concrete retaining walls, construction of the drainage system of the new grade, construction of station walls and canopies.

Cost of work.....\$472,000.00

Amount of concrete used, 43,000 cubic yards.

Amount of sewer pipe used, 6,056 lineal feet.

Amount of soil excavated, 230,000 cubic yards.

Amount of granite pavement, 2,600 square yards.

38 manholes.

Conduits, 157,400 duct feet.

HENRY DUMARY.

For constructing sewer from Church avenue and railroad cut through East 18th street to Beverly Road.

Size of sewer 36 inches.

Length of sewer, 1,300 lineal feet.

Cost of sewer construction..... 10,600.00

For construction of sewer running from railroad cut and Newkirk avenue and extending to Avenue F main city sewer.

Size of sewer 36, 42 and 54 inches.

Length of sewer, 5,800 lineal feet.

Cost of sewer construction..... 42,500.00

THOMAS G. CARLIN.

For construction of new station buildings at Beverly Road, Avenue C and Newkirk avenue. The Railroad Company pays the entire cost of these new stations.

Brighton Beach Improvement

Report of cost of same will be made under separate headings in completed report.

MILLIKEN BROTHERS.

For construction of steel highway bridges over railroad cut at Beverly Road, Avenue C, Avenue D, Ditmas avenue, Newkirk avenue and Foster avenue.

Aggregate tonnage, 447 tons.

Average tonnage of each bridge, 74.5 tons.

Cost of above bridges..... 41,068.00

WAYNE IRON WORKS.

For erection of iron fence on retaining walls, comprising 12,000 lineal feet.

Cost of same..... 17,000.00

CHARLES CRANFORD.

Reconstructing Foster avenue sewer to permit lowering of grade of right-of-way.

Cost of same..... 13,972.00

Cost of concrete arched flooring for highway bridges 13,700.00

Cost of restoring all street pavement and sidewalks at streets intersecting railroad..... 6,500.00

SECTION No. 3.

The work of Section No. 3 consisted of the separation of the grade of the railroad from the grade of the highways at the southerly terminus of Section No. 2 extending south a distance of 3.7 miles to Neptune avenue and descending to normal grade from Neptune avenue, to a point between Neptune avenue and the Brighton Beach Hotel.

The railroad was elevated the entire length of this section, crossing the following highways: Avenue J, Avenue K, Locust avenue, Chestnut avenue, Elm avenue, Avenue N, Avenue O, Kings Highway, Avenue R, Avenue S, Avenue T, Avenue U, Avenue V, Neck Road, Shore Road and Neptune avenue.

By referring to Section No. 1 of the Act creating the

Brooklyn Grade Crossing Commission it will be noted that it requires the New York, Brooklyn and Manhattan Beach Railroad to be elevated between Avenue J and a point south of Neptune avenue, so as to carry all present and future intersecting streets between said points beneath said railroad.

Power is also given to this Commission to relocate the right-of-way of the Manhattan Beach Road as then existing, so as to parallel the easterly side of the Brighton Beach Road, provided such relocation is consented to by the proper city authorities. When so relocated the act requires the railroad to be elevated.

As the Commission had decided to relocate and elevate the Manhattan Beach line as above outlined, it will be readily seen therefore that it became obligatory on the Commission to elevate the Brighton Beach Railroad to a height corresponding to that proposed for the Manhattan Beach line when relocated.

In pursuance thereto the Commission voted to elevate the Brighton Beach Road on the 22d day of December, 1905, and subsequent thereto plans and specifications for Section No. 3 were amended on July 3, 1906, July 20, 1906, December 28, 1906, and March 26, 1907. Plans being filed with the City Clerk on December 26, 1905.

The elevation of the road was accomplished by the construction of an earth embankment, material for which was supplied by the excavation of Section No. 2, and also a portion of the material excavated from Section No. 1 of the Bay Ridge Improvement of the Long Island Railroad Company, which work was going on simultaneously with the work of this section and under the direction of this Commission.

Additional material was also secured from adjacent work being carried on by the Long Island Railroad Company. But for the material supplied from these sources, the work of Section No. 3 of the Brighton Beach Improvement would have required double the time for its completion and a greatly increased expenditure.

The contract covering the work of the Bay Ridge Improvement required that the excavated material be placed in embankment of that work or be delivered at Manhattan Beach Junction

by Contractor W. H. Gahagan, and pursuant to a separate agreement between the Brooklyn Heights Railroad Company and Contractor Gahagan and approved by the Commission, was hauled along the line of the Brighton Beach Railroad, south of Avenue O as far as Sheepshead Bay thus creating the embankment between those points.

The elevation of the entire right-of-way of the railroad could be accomplished either by the construction of retaining walls and filling in between the walls, or the purchase of land adjoining the right-of-way for the purpose of having an embankment with slopes extending over the purchased property.

As the purchase of land and the construction of slopes would cost less than to construct concrete retaining walls, it was decided to adopt the former method, subject to the opinion of the Corporation Counsel that it would be legal for the City to participate in the purchase of land necessary to form the slope of the embankment.

The question was submitted to the Corporation Counsel and under date of June 25, 1905, an opinion was given favorable to the adoption of embankment method.

In view of the heavy summer traffic prevailing on the Brighton Beach Road, it was also thought wise to arrange for the stoppage of all passenger traffic on the Brighton Beach Road during the construction of the embankment, and arrangement was made between the Brooklyn Heights Railroad and the New York, Brooklyn and Manhattan Beach Railroad, with the approval of the Commission, to electrify the Manhattan Beach Railroad from Manhattan Beach Junction to Sheepshead Bay Junction and to divert the traffic of the Brighton Beach Road over the tracks of that company. The object in making this arrangement was to allow the work to proceed with greater rapidity and by the suspension of all traffic to eliminate the danger of accidents to the traveling public, which would be more or less prevalent because of the constant running of dirt trains, trains bringing material and supplies, contractor's equipment, etc. It would also avoid the necessity and expense of constantly shifting the tracks for the purpose of maintaining traffic.

Brighton Beach Improvement

Under an opinion received from the Corporation Counsel, dated December 11, 1906, the legality of the action of the Commission in this respect was approved.

The amount of land required for the construction of the slope of the embankment was a strip 22 feet wide, immediately adjacent to the easterly side of the right-of-way.

At Neck Road it became necessary to construct an incline on the westerly side of the main line, allowing traffic to be maintained for the Sheepshead Bay Race Track. This incline reaches a low point at Avenue X, crossing under the Brighton Beach Road and the Manhattan Beach Road and continuing over the property of the Brooklyn Heights Railroad Company to the depot at the Sheepshead Bay Race Track.

There has also been constructed an incline for traffic returning from the Sheepshead Bay Race Track Station. Said incline being on the easterly side of the main line between the tracks of the main line and the Manhattan Beach Road, reaching the new grade of the road at Neck Road.

The following contracts were made covering the work of Section No. 3:

CHARLES CRANFORD.

Supplementary contract to build abutments at streets
on Section between Long Island Railroad Cross-
ing and Avenue O.

Amount of material excavated, 2,400 cubic yards.

Amount of concrete used, 3,200 cubic yards.

Total cost..... \$21,350.00

BROOKLYN HEIGHTS RAILROAD COMPANY.

Excavating foundation and building bridge abut-
ments, and making a four track embankment
from Avenue O to and including Neptune
avenue.

Amount of material excavated, 4,600 cubic yards.

Amount of concrete used, 9,500 cubic yards.

Amount of material in embankment, 467,000
cubic yards.

Cost 156,000.00

Brighton Beach Improvement

BROOKLYN HEIGHTS RAILROAD COMPANY.

Work on their own portions of abutments and walls at streets where stations are located.

Amount of material excavated, 1,940 cubic yards.

Amount of concrete used, 3,540 cubic yards.

Total cost..... 23,000.00

BARTH S. CRONIN.

Building coffer dams and excavating foundation pits and driving piles for abutments and piers at Neptune avenue.

Coffer dam work.....\$5,100.00

Excavation and pile driving..... 8,025.00

Total contract..... 13,125.00

ABBOT-GAMBLE COMPANY.

Putting in solid floor construction on railroad bridges from Avenue J to and including Neptune avenue.

Amount of flooring, 73,000 square feet.

Amount of contract..... 72,500.00

FRANK J. GALLAGHER.

Grading nine streets to get 14-foot headroom under bridges on Section No. 3.

Estimated amount of contract..... 14,000.00

MILLIKEN BROTHERS.

Furnishing steel bridges on Section No. 3.

Amount of steel, 2,500 tons.

Total cost..... 238,500.00

Railroad Company paid for 460 tons of steel (included in above) amounting to \$42,320.00.

BROOKLYN HEIGHTS RAILROAD COMPANY.

Under contract to build abutments and make embankment fill on Section No. 3, are building the incline at Neck Road.

Estimated quantities:

Concrete, 7,900 cubic yards.

Excavation, 20,000 cubic yards.

Reinforcing rods, 74 tons.

Estimated cost..... 77,000.00

BAY RIDGE IMPROVEMENT

LONG ISLAND RAILROAD

FIRST PROGRESS REPORT

1903-1907

SCOPE OF THE WORK

The Bay Ridge Improvement comprehends the elimination of all grade crossings of the steam railroads operating under original charters known as the New York, Bay Ridge & Jamaica Railroad Co., the New York & Manhattan Beach Railway Co., and the Long Island City & Manhattan Beach Railroad Co., consolidated into the New York, Brooklyn & Manhattan Beach Railway Company, which is now leased to and for the purpose of this report will be referred to as the Long Island Railroad Company.

The Act of the Legislature, which became a law May 9, 1903, provided that the work of the Bay Ridge Improvement should be carried on at the joint expense of the Long Island Railroad and the City of New York, each to pay one-half of the cost. The maximum amount to be expended by the City was limited to Two and one-half million dollars (\$2,500,000) with the provision that any additional cost in excess of the joint expense of Five million dollars (\$5,000,000) should be borne by the Railroad Company only, except that where additional bridges were built at streets not actually opened or traveled so as to provide for future crossings, the cost to the City was to be increased so as to cover one-half of the expense of such additional bridges.

NECESSITY FOR THE WORK.

At the time of the construction of these railroads, the territory through which they ran consisted mainly of farm land, but the rapid extension of population into the suburban districts of the Borough of Brooklyn resulted in the development of residential neighborhoods adjacent to the railroads, attended with all the

inconveniences and dangers pertaining to the operation of steam roads crossing highways at grade. To provide for the present and future requirements of these rapidly growing sections, and to establish all the conveniences and facilities necessary for municipal living, such as water mains, sewer systems, electric light, telegraph and telephone conduits, and to enable additional streets to be opened across the right of way of the railroad so as to provide for necessary foot passenger and vehicular traffic, it became necessary to make a permanent separation of the grade of the railroad from the grade of the highways by elevating or depressing the right of way of the Railroad. The separation of grades contemplated by the legislative Act covers that portion of the Railroad extending from the Brooklyn Borough Line to Bay Ridge, a distance of 10.4 miles, and from Manhattan Beach Junction to Manhattan Beach, a distance of 3.7 miles. The number of grade crossings to be eliminated, existing at the time of passage of the Act, from Bay Ridge to Brooklyn Borough Line was 41, and from Manhattan Beach Junction to Manhattan Beach 10.

Upon the organization of the Commission, it was enabled to purchase from the Railroad Company the surveys and maps covering the proposed Bay Ridge Improvement, thus saving the Commission the time necessary to have the same made under its own direction.

OUTLINE OF PLANS.

The consideration of the plans of the Bay Ridge Improvement involved a re-adjustment of the right of way at certain points; the establishment of new grade lines; the re-construction of existing freight yards conformable to the new grade lines of the right of way; the re-construction of sidings and of connections with private yards to conform to the new established grade. A very important feature of the Act of the Legislature was the provision for the elevation or depression of the entire width of the right of way. The Commission found this could be accomplished either by the construction of retaining walls and filling in between the walls for the purpose of elevation, or by the construction of retaining walls to sustain the sides of the cut if the

right of way was depressed by excavation, or by purchasing land adjacent to the right of way, said land to be utilized for the construction of slopes. As the estimates of the Engineers indicated that land adjacent to the right of way could be purchased and utilized for forming slopes to sustain an embankment in the event of the right of way being elevated, and utilized to sustain slopes in the event of the right of way being depressed, it was decided to require the purchase of land for the forming of slopes, should such action by the Commission in the opinion of the Corporation Counsel be authorized by law. A favorable opinion to that effect was given by the Corporation Counsel January 25, 1907.

In compliance with the request of the Long Island Railroad Company, plans were also adopted providing for a form of construction which would increase the facilities of the Railroad over its existing right of way at certain points, said increase in facilities, however, to be paid for only by the Long Island Railroad Company and not to be a charge against the Improvement.

DETAIL OF CONSTRUCTION.

The plans finally adopted by the Board called for the depression of the Railroad from Bay Ridge for a Distance of 5.6 miles, to a point between Albany Avenue and Avenue G, and for the elevation of the road on an embankment from this point a distance of 2.8 miles, to a point about 1800 ft. north of New Lots Road; thence following a gradual descending grade to a point about 425 ft. south of Atlantic Avenue; thence requiring a tunnel to be constructed about 3500 ft. in length, coming to grade at the original surface at a point about 200 ft. south of Central Avenue; then again elevated on an embankment terminating at the Borough Line.

Owing to the depression of the right of way, it became necessary for the Commission to arrange for the re-construction of sewers at the following points: Eighth Avenue, Ninth Avenue, Ft. Hamilton Avenue, Twelfth Avenue, New Utrecht Avenue, Flatbush Avenue, East 35th Street.

The work necessitated the changing of water and gas mains

and electric connections at all opened streets, and the shifting of street railway tracks and re-laying of same so as to prevent an interruption of traffic at the following railroad crossings:

Flatbush Avenue,	Gravesend Avenue,
Ocean Avenue,	New Utrecht Avenue,
Brighton Beach Railroad,	Coney Island Avenue,

The existing grade crossings traveled by the Public from Bay Ridge to the Borough Line were as follows:

First Avenue,	Ocean Avenue,
Ft. Hamilton Avenue,	Amersfort Place,
Kowenhoven Lane,	Flatbush Avenue,
11th Avenue,	Kowenhoven Rd. (Kgs. Hwy.)
New Utrecht Avenue,	Wyckoff Avenue,
15th Avenue,	Canarsie Road,
60th Street,	Rockaway Avenue,
53rd Street,	New Lots Road,
New Utrecht Road,	Sutter Avenue,
18th Avenue,	Pitkin Avenue,
52nd Street,	Glenmore Avenue,
Gravesend Avenue,	Liberty Avenue,
East 3rd Street,	Vesta Avenue,
Coney Island Avenue,	East New York Avenue,
Atlantic Avenue,	Stewart Street,
Herkimer Street,	Eastern Parkway,
Fulton Street,	La Sales Place,
Norman Place	Bushwick Avenue,
Broadway,	Aberdeen Street,
Conway Street,	Furman Avenue,
	Central Avenue.

A total of 41. Of the above, Amersford Place, an old country road not on the City Map and practically eliminated as a thoroughfare by the opening of Flatbush Avenue, was abandoned; Wyckoff Avenue is shifted to conform with the lines of East 83rd Street; and Canarsie Road is shifted to conform with the lines of East 92nd Street. Additional bridges are being constructed on the lines of the streets laid on the City Map but not yet opened, as follows:

16th Avenue,	Albany Avenue,
59th Street,	Avenue G,
17th Avenue,	Utica Avenue,
East 14th Street,	Avenue D,
Nostrand Avenue,	Ralph Avenue,
Brooklyn Avenue,	Remsen Avenue,
Avenue H,	East 94th Street,
	Blake Avenue.

Two bridges for pedestrians only were also provided for, one at East 18th Street and one at Belmont Avenue, making a total of 17 new streets provided for. On this section there were operated, crossing the tracks of the Railroad at grade, 9 lines of street railways, on two of which are also operated motor trains, and one crossing of steam and electric railroad tracks, namely, Atlantic Avenue.

MANHATTAN BEACH SECTION.

The section running from Manhattan Beach Junction to Coney Island, for the purposes of this report is designated as the Manhattan Beach section. The original Act of the Legislature empowered the Commission to relocate this section adjacent to the easterly side of the Brighton Beach Railroad, if in the judgment of the Commission it was to the public interests so to do, after acquiring the consent of the proper authorities to that end. Because of the close proximity of the Brighton Beach Railroad to the Manhattan Beach Railroad and the undesirable condition which would be created by the construction of an embankment for the Manhattan Beach section on its present right of way and the construction of an embankment for the Brighton Beach Railroad on its existing right of way, thus placing the property lying between the two elevated roadbeds in a position which would undoubtedly affect its value and impair its advantages as a residential section, the Commission voted to relocate the Manhattan Beach section as above outlined. Application was made jointly by the Railroad Company and the Brooklyn Grade Crossing Commission to the Board of Estimate and Apportionment in January, 1906, and the application was granted on June

7, 1907, pursuant to an agreement to be made between the City of New York and the Long Island Railroad. As re-located, the plans finally adopted by the Board called for the elevation on a dirt embankment of the Manhattan Beach section for a distance of 3.3 miles, which would result in the separation of the grade of the railroad from the grade of the streets at the following streets:

Opened and Actually Traveled Streets:

Locust Avenue,	Avenue U,
Chestnut Avenue,	Neck Road,
Elm Avenue,	Shore Road,
Kings Highway,	Neptune Avenue,

Bridges to be Placed at Streets Shown on the City Map, but not Yet Opened:

Avenue I.	Avenue P,
Avenue K,	Avenue R,
Avenue L,	Avenue S,
Avenue N,	Avenue T,
Avenue O,	Avenue V,
	Avenue Y.

It was decided to abandon the following old lanes, action to that effect being taken by the Board of Estimate at the request of the Board:

McGaws Lane,	Johnsons Lane,
Johnsons Road,	Emmers Lane.

Provision was made to take care of the traffic of these lanes by placing bridges at the nearest adjacent avenues shown on the City map. This made a total of 19 streets to be provided for. On the above section there is one street surface railway crossing the tracks of the Railroad at grade to be eliminated, namely, Neptune Avenue.

PROGRESS OF THE WORK.

The bids for the first portion of the work of the Bay Ridge Improvement were opened in the rooms of the Commission on April 27, 1905. The contract was awarded to Beinhauer & See, on April 27, 1905, and provided for the construction of concrete bridge abutments and adjacent retaining walls at the following points:

New Utrecht Avenue,	Brooklyn Avenue,
17th Avenue,	Albany Avenue,
53rd Street,	Avenue H,
18th Avenue,	Avenue G,
52nd Street,	Ralph Avenue,
Gravesend Avenue,	Avenue D,
East 3rd Street,	East 83rd Street,
Flatbush Avenue,	Remsen Avenue,
	Rockaway Avenue.

The work of the Improvement was begun on May 19, 1905, at Gravesend Avenue, Parkville, consisting of excavating a trench for the retaining wall running parallel with Gravesend Avenue, forming the easterly end of the Parkville freight yard, to provide for the lowering of the bed of the freight yard to conform to the new grade to be established for the main right of way. On this occasion, the Commission and the Borough Officials participated in the ceremonies of starting the work. Appropriate addresses were made by Hon. Martin W. Littleton, President of the Borough of Brooklyn, on behalf of the City, and by President Frank M. Brooks, of the Grade Crossing Commission, and President Ralph Peters, of the Long Island Railroad Company. The first shovelful of earth was removed by Miss Beatrice Brooks, the five-year-old daughter of the President of the Commission. The method of carrying on the work as projected by Chief Engineer Morris was first to construct all the bridge abutments and retaining walls, and when the abutments were completed to place in position the steel girders required to form the bridges, after which the excavation was to be made which would establish the depressed roadbed at the new grade line laid out on the plans, the material excavated being transported to that portion of the

work to be elevated upon an embankment. This method of construction obviated the entire closing of any streets, so that the usual street traffic was maintained during the progress of the work.

Bids for the excavation were opened in the rooms of the Commission on December 12, 1905, and the contract awarded to W. H. Gahagan on December 22, 1905. Bids for the steel work for the bridges were opened in the rooms of the Commission on May 19, 1905, and contract awarded to Milliken Brothers on May 26, 1905.

Sundry small contracts were let as work progressed for the construction of sewers, the surfacing of roadways, changing of water pipes, construction of solid floors and parapet walls for highway bridges. The Railroad Company did the work of changing the track with their own forces, under the direction of the Commission, by day labor, as this was work that could not be estimated upon or satisfactorily done by contract.

WORK ACCOMPLISHED AT THE TIME OF WRITING THIS REPORT:

The work accomplished up to this time consists of the depressing of the main line from 7th Avenue to Avenue G, a distance of $4\frac{1}{2}$ miles. The material excavated to make this depression being used to form an embankment from Avenue G to New Lots Road, a distance of $2\frac{1}{2}$ miles, thus eliminating all grade crossings on the main line for a distance of 7 miles, with the exception of four highways, where permanent bridges will be completed within a few months. Also a portion of the excavated material was diverted to the embankment on the Manhattan Beach Branch, from Avenue J to Shore Road, a distance of $2\frac{1}{2}$ miles. On this division some work has been done towards constructing bridges over the intersecting streets.

On the main line, from 7th Avenue to New Lots Road at East New York, work is under way on 36 bridges, and of this number 18 are practically completed.

The Railroad traffic is now maintained on the depressed grade from 7th Avenue to Ocean Parkway and from East 14th

Street to Albany Avenue, and on the embankment from Wyckoff Avenue to and including New Lots Road. Two adjacent freight yards have been depressed and are operating on their permanent grades at Parkville and Vanderveer Park.

The grade crossings where the three principal intersecting railroads operating motor trains cross the Long Island at grade were eliminated as follows: The Prospect Park & Coney Island R. R. on Gravesend Avenue, September 19, 1906; The Bath Beach & West End R. R. on New Utrecht Avenue, July 16, 1907; Brighton Beach Railroad, January 17, 1908.

The bridge abutments supporting both the Railroad bridge and Highway bridges are constructed of concrete, for which was used the best quality of Portland Cement, and the stone used throughout the work was crushed limestone. The sand was obtained from the excavated portions of the work, as it was of exceptional good quality.

The Highway bridges, that is the bridge floor, are made of steel I-beams, placed in parallel rows and completely encased with concrete, forming a slab the width of the highway and spanning the Railroad tracks beneath. This makes a floor that is as near permanent as engineering skill can make it. Upon this floor in the roadway is laid a pavement of various types, consisting on some of wood block and on others sheet asphalt or asphalt block. In place of a fence or iron railing that is usual on bridge structures, there has been built a reinforced concrete wall of a design that is pleasing to the eye and also of permanent construction. All the Highway bridges built to date are of this type. The water pipes, gas mains and electric conduits in the streets where bridges were built were relaid in such manner as to pass between the I-beams and the floor of the bridge in a chamber especially designed for their use. This chamber was placed under the sidewalk in most cases so as to be of convenient access for the removal or placing of more pipes or ducts.

The Railroad bridges, that is where the tracks of the Railroad cross above the highways, are constructed of steel girders spanning the highways. The floor of these bridges is constructed of concrete and I-beams, and this floor is thoroughly waterproofed

to prevent any dripping of rain-water or oil through the bridge to the highway beneath. Upon this floor the ballast, ties and rails are laid. This makes practically a noiseless bridge and the passage of trains overhead is hardly noticeable to pedestrians or horses on the highway underneath. These Railroad bridges are practically all of one type, with the exception that at some streets, where ample height is obtained, the girders instead of being placed between the tracks were placed underneath, making what is known as a "deck bridge," the floor being of the same character as the former type.

At Wyckoff Avenue a brick arch was constructed in place of a steel bridge; this was owing to conditions that made it favorable to construct that type of bridge.

At some streets the angle formed by the Railroad was so acute that although the street was only 64 feet wide the bridge structure was 138 feet long. This was the case at Avenue G, which necessitated main girders over the roadway of 92 feet. Four of these girders weighed 42 tons each, an unusual weight for girders. The total weight of steel in this bridge is nearly one million pounds. If the steel in this particular bridge were made into ordinary telegraph wire, it would reach 4,000 miles, and this, it must be remembered, is simply for a bridge across one street in the Borough of Brooklyn.

The total weight of steel in bridges of all types constructed to date is 4,500 tons.

The total amount of concrete used in the bridges, abutments and retaining walls amounts to 40,000 yards. This would make a stone shaft 10 feet square and 10,800 feet high, or approximately 2 miles.

The total amount of material excavated is 1,225,000 cubic yards, and this was placed in the embankments as above noted. To give a fair idea of this amount of material, it would cover the entire area of Prospect Park to a depth of $1\frac{1}{2}$ feet. This immense amount of material was excavated by Contractor Gahagan with four Steam Shovels and loaded into specially constructed dump cars, which were hauled away to the proper point for embankment construction.

The sides of the depressed portion are retained by earth having its natural slope. This slope is protected by sodding and seeding, giving a Parking appearance as well as protecting the depressed roadbed from the washing effects of rain storms. The embankment section is simply the excavation reversed; that is, if the excavation were taken out in one block and turned up side down it would form the embankment, and the slopes of these embankments are to be protected in the same manner as the depressed section.

The cost of the work executed to date is estimated at about \$1,500,000, which cost is divided between the Long Island Railroad Company and the City of New York.

WORK TO BE DONE TO COMPLETE BAY RIDGE IMPROVEMENT.

(a) The reconstruction of right of way from New York Bay to Seventh avenue, a distance of about one mile.

(b) The depression of the freight yard extending from New Lots Road to the entrance of proposed tunnel at East New York avenue.

(c) The construction of a tunnel on a new line for a distance of about 3,500 feet from East New York avenue to the Evergreen cemetery, through the hill between the above points.

(d) The construction of an embankment and bridges from the Evergreen cemetery to the borough line, a distance of one-half mile.

The East New York freight yard, which is the distributing point of freight for the entire East New York and Brownsville sections, comprises a strip of land 200 feet wide and a mile long, extending from New Lots Road to Liberty avenue, between Vesta avenue and Junius street. This yard will be depressed and crossed over by the following streets: Blake avenue, Sutter avenue, Pitkin avenue, Glenmore avenue, Liberty avenue and Belmont avenue. The work will be so arranged as to reduce to a minimum the changing of grades of the intersecting and adjoining streets. Under the Grade Crossing Act it was impossible to change the grade on the Long Island Railroad between the

points mentioned as contemplated by the Law, as there was a steam railroad in operation on private right of way and adjoining the east side of the land of the Long Island Railroad. This was the Brooklyn & Rockaway Beach Railroad, known as the Canarsie Railroad, and the Law did not cover the abolishing of grade crossings of this railroad. The matter was settled, however, by the Long Island Railroad and the Brooklyn Heights Railroad jointly purchasing the Canarsie Railroad, dividing the property, and the Brooklyn Heights elevating its portion on a steel structure a sufficient height to allow the streets to cross the proposed depressed railroad yard and pass underneath the elevated structure. This was done without expense to the City of New York.

From a point at Liberty avenue, where the tunnel commences, to the Evergreen cemetery the present right of way of the railroad forms an irregular curve, and it was found, after investigation and study, that a very large sum of money would be saved and the work carried on with greater convenience and dispatch if the present railroad were abandoned and the road rebuilt on a straight line between Liberty avenue and the intersection of the present railroad at Granite street. The original law did not allow the Board to make this change of line; therefore a special act was passed by the Legislature on July 25, 1907, which made this change possible, and plans are being prepared so that work can be started at an early date.

An approximate estimate of the cost of the work remaining to be done on the Bay Ridge Improvement is \$3,500,000.

BRIGHTON BEACH IMPROVEMENT

SECOND PROGRESS REPORT

1908-1909

The work unfinished during the year 1907, and completed during 1908, consisted of erecting railroad bridges at Kings Highway and Shore Road, placing solid floors on bridges (both railroad and highway), completing the earth embankment, regulating, grading and paving intersecting streets, and other miscellaneous work made necessary by the Improvement.

THE COST OF WORK DURING 1908 IS AS FOLLOWS:

Restoring pavements, sidewalks and completing floors on highway bridges—streets between Church Avenue and L. I. R. R.	\$15,023.00
Grading—paving and regulating streets between L. I. R. R. and Neptune Avenue on account of change of their grade due to the Improvement	21,990.00
Erecting steel R. R. bridges at Kings Highway and Shore Road and completing highway bridges	32,394.00
Completion of solid concrete floors on railroad bridges	7,980.00
Steel foot bridges, concrete floors and approaches at Avenues A and G	12,420.00
Subway at Avenue H, Fiske Terrace Station.....	3,618.00
Neck Road Incline and steel R. R. bridge	32,100.00
New 8-inch water main from Neck Road to Brighton Beach to take the place of an old main covered by earth embankment	6,958.00
Earth-fill in embankment between Shore Road and Neptune Avenue	5,740.00
Removal of temporary bridges and stations erected while work was under way	1,898.00
Temporary tracks and O. H. Line changes on account of failure of Milliken Bros. to deliver steel bridges	3,012.00

Brighton Beach Improvement

Completion of fence on retaining walls	1,155.00
Completion of two permanent operating tracks between Church Avenue and Brighton Beach	5,492.00
Maintenance of two operating tracks on the em- bankment for one year, ending with 1908.....	3,431.00
Permanent O. H. work between Shore Road and end of the Improvement	1,501.00
Restoring yards, lawns and property injured by the Improvement	626.00
Electric Light Company, poles and wires moved and changed	491.00
Miscellaneous work Church Avenue to C. I.	2,760.00
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Total.....	\$158,589.00

The Commissioners appointed by the Supreme Court to assess the damage to abutting property on Newkirk Avenue on account of the change of grade of this street due to the work of the Improvement, presented their report, awarding damages to various owners, the amount including expenses of the Commissioners, and chargeable to the Improvement, being

\$ 13,953.17

THE TOTAL AMOUNT EXPENDED DURING THE YEAR 1908, CHARGEABLE TO THE BRIGHTON BEACH IMPROVEMENT, IS SUMMARIZED AS FOLLOWS:

Cost of the work completed during the year 1908	158,589.00
Award of Commissioners to various property owners on account of change of grade of Newkirk Avenue	13,953.17
Labor and material furnished by Railroad Com- pany and Contractors prior to January 1, 1908 —Engineers and other expenses during 1908, paid during the year	60,205.98
<hr/>	
Total during 1908.....	\$232,748.15

Brighton Beach Improvement

During the year 1909, the only work done on the line of the Improvement was the grading, regulating and paving of Avenue Y and grading Avenue K to the east line of East 15th Street.

The opening of Avenue Y allowed the filling-in of Em-mers Lane, the roadway having been kept open when the embankment was made by carrying the tracks across the lane on a temporary wooden trestle.

BRIDGES AT AVENUES L AND P

The Board having previously authorized the construction of permanent steel bridges at Avenues L and P, the Railroad Company, with the approval of the Commission, entered into contract in the early fall with the Fort Pitt Bridge Works for the steel and with Oscar Daniels Company for the erection of the bridges, also with the Newman Construction Company for the work of building the abutments, excavating and removing the earth-filling in the embankment and placing reinforced concrete floors on the bridges. The work is now well under way, the abutments at Avenue P having been completed and the excavation at Avenue L started. The steel for the bridges will be delivered on or before February 1st next, and the entire work, it is expected, will be finished by May 1st, 1910.

The approximate cost of the work at both these streets estimated at \$44,200.00

The total expenditures to December 31, 1909, chargeable to the Brighton Beach Improvement, exclusive of amounts paid wholly by the Railroad Company, is as follows:

Park and Prospect Places	\$73,934.38
Church Avenue to L. I. R. R.	603,282.69
L. I. R. R. to Brighton Beach	732,217.57
General Charges	142,077.40
Total.....	<hr/> \$1,551,512.04

BAY RIDGE IMPROVEMENT

SECOND PROGRESS REPORT

1908-1909

During the year 1908, apparently a small amount of work was accomplished, principally upon the request of the Mayor of New York, asking the Board not to let contracts for future work on account of the prevailing financial depression, and also the Commission could not do any work on the Manhattan Beach Line for the reason that the City did not finally approve the agreement for the Railroad to change its line until January 29th, 1909.

SEVENTH AVENUE TO NEW LOTS ROAD

The work during the years 1908-09, consisted in finishing the bridges for thirty-four (34) streets between Fort Hamilton Avenue and New Lots Road, and also a small amount of excavation, the lowering of tracks between Ocean Parkway and East 14th Street, and widening the embankment to practically the full width between Avenue "G" and New Lots Road. This covered a distance of about seven miles, and on this stretch all the bridges are completed with the exception of the floors to be placed on the East 18th Street foot-bridge, the Railroad Bridges at Kowenhoven Road, Avenue "D" and Ralph Avenue.

In October the Board authorized contract to be made with Frank J. Gallagher for the concrete piers on Seventh Avenue, and also with the American Bridge Company for the furnishing of steel work for this bridge. The work is now going on, the masonry being nearly constructed and the steel work is being delivered.

LIST OF STREETS AT WHICH BRIDGES HAVE BEEN COMPLETED ON THIS SECTION

Fort Hamilton Avenue, Eleventh Avenue, New Utrecht Avenue, Fifteenth Avenue, 60th Street, Sixteenth Avenue, 59th Street, Seventeenth Avenue, 53rd Street, New Utrecht Road,

Eighteenth Avenue, 52nd Street, Gravesend Avenue, East Third Street, Coney Island Avenue, East 14th Street, Brighton Beach Crossing, East 18th Street (not finished), Ocean Avenue, Nosstrand Avenue, Flatbush Avenue, Brooklyn Avenue, Avenue "H", Albany Avenue, Avenue "G", Utica Avenue, Kowenhoven Road (Kings Highway) (not finished), Avenue "D" and Ralph Avenue (not finished), Wyckoff Avenue, Remsen Avenue, East 92nd Street (Canarsie Road), East 94th Street, Rockaway Avenue and New Lots Road. Of these bridges fifteen (15) were at unopened streets.

MANHATTAN BEACH DIVISION

AVENUE "J" TO NEPTUNE AVENUE

On this division a small amount of work was accomplished during the year 1908, principally constructing the embankment, and also five bridges were completed, namely: Avenue "J", "K", Locust, Chestnut and Elm. The tracks of the railroad were removed from the surface, and placed on the new embankment, thus eliminating five (5) grade crossings.

In the Spring of 1909, work was resumed on the section between Elm Avenue and Manhattan Beach, and practically completed at the close of the year, there having been constructed and finished the embankment and fourteen (14) bridges. On the embankment one track has been laid and in operation, though the tracks of the railroad have not been removed from the surface between Avenue "N" and Neptune Avenue. It is expected that all the grade crossings will be abandoned in this section by the 15th of March, 1910. The bridges constructed on this section are as follows: Avenue "J", Avenue "K", Locust Avenue, Chestnut Avenue, Elm Avenue, Avenue N, O, Kings Highway, R, S, T, U, V, Neck Road, two bridges at B. R. T. connection to Race Track, Avenue "Y", Shore Road, Neptune Avenue; also bridges are now under construction at Avenue "L" and "P." Of these bridges ten (10) are at unopened streets and avenues.

NEW LOTS ROAD TO EAST NEW YORK AVENUE

On May 25th, 1909, bids were opened in the Commission rooms for work between New Lots and East New York Ave-

nue. This covered the lowering of the freight yard tracks of the Railroad Company between those points, and it was estimated to cost about \$580,000. On May 28th, the Commission approved the bid of Walter H. Gahagan, and authorized the Railroad Company to enter into contract with him for that portion of the work. On this section of the work, it was necessary to underpin the columns of the Canarsie Elevated Railroad, and to construct a retaining wall from a point near Livonia Avenue to Glenmore Avenue, which wall was completed by December 31st, as well as the abutments for the bridges at Blake, Sutter and Pitkin Avenues, and also a small amount of excavation was done which was placed in the embankment near New Lots Road. Contracts were also made with the Fort Pitt Bridge Works for the steel work for the bridges on this section. The steel work was all delivered, and one bridge erected and floor completed, namely, Blake Avenue.

The Railroad Company shifted the main running tracks temporarily between Liberty Avenue and Livonia Avenue, in order that the work of construction could proceed.

COSTS

The amount of money expended for construction purposes for the years 1908-09 on the three sections above mentioned was \$650,426.11 which was all known as "Joint Account," and does not include any additional work done by the Railroad Company for its own use.

The total amount "Joint Account" including construction, engineering and Commission expenses for the years 1908-09, was	\$745,276.48
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The total amount of "Joint Account" expenditure to date	1,983,690.92
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The total amount expended to date including "Joint Account" and additional work at the Railroad Co.'s entire expense, and also land for slopes between 8th Ave., and New Lots Road	3,515,801.93
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GENERAL INFORMATION

The following list of forty-nine (49) bridges, with the City's per cent. of the total cost, the original tracks of the Railroad at each bridge, the number of tracks provided for by the new bridges, and the original width of the Railroad Right-of-Way. This cost includes the foundation excavation, concrete, steel, erection of same, floor slab, street approach work and parapet.

The table shows also the cost to the City and the additional work done at the Railroad Company's expense.

BRIDGES—BAY RIDGE TO NEW LOTS ROAD

Highway Bridges	Total Cost	City's Share	City's Per Ct.	Tracks Orig.-New		R. of W. Width
First Avenue	\$125,000
Ft. Hamilton Ave.	19,087	\$ 7,273	37	2	4	35'
Eleventh Ave.	15,845	6,523	41	2	4	47.5'
New Utrecht Ave.	14,948	7,474	50	2	2	67'
Fifteenth Ave.	14,061	6,228	44	2	3	35'
Sixtieth Street	20,629	10,314	50	2	2	35'
16th Ave. & 59th St.	20,370	10,185	50	2	2	35'
Seventeenth Ave.	13,638	6,819	50	2	2	35'
Eighteenth Ave.	29,150	14,575	50	2	2	35'
Fifty-second St.	12,577	5,507	43	2	3	35'
Gravesend Ave.	19,049	9,524	50	2	2	99'
East Third Street	7,034	3,517	50	2	2	35'
Coney Island Ave.	16,444	8,222	50	2	2	42½'
E. Fourteenth St.	8,105	4,052	50	2	2	50'
Brighton Bch. Xing.	14,522	7,261	50	2	2	50'
Ocean Avenue	25,334	10,569	41	2	4	38.7'
Nostrand Avenue	15,159	7,247	48	4	4	99'
Flatbush Avenue	41,172	19,153	46	2	4	67'
Brooklyn Avenue	16,608	5,352	32	2	5	35'
Av. H. & Albany Av.	60,122	23,873	39	2	4	35'

Bay Ridge Improvement

Railroad Bridges	Total Cost	City's Share	City's Per Ct.	Tracks Orig.-New		R. of W. Width
Avenue "G"	63,663	21,780	34	3	5	50'
Utica Avenue	21,278	6,452	30	2	4	35'
Kowenhoven Road (not finished)	27,621	9,534	35	2	4	42½'
Ralph Ave. & Ave. D. (not finished)	30,837	10,450	34	2	4	35'
Wyckoff Avenue	17,914	5,448	30	2	4	35'
Remsen Avenue	19,879	9,939	50	2	4	99'
East 92nd Street	15,117	7,558	50	2	4	99'
East 94th Street	15,471	5,213	34	2	4	35'
Rockaway Avenue	24,266	9,102	37	2	4	42½'
New Lots Road	34,019	12,475	36	2	5	67'

\$778,919 \$271,619

City's Share

35%

R. R. Co's. Share 65%

BRIDGES ON MANHATTAN BEACH BRANCH

Avenue "J"	\$ 23,650	\$11,825	50	2	3	57.5'
Avenue "K"	13,776	6,888	50	2	2	40'
Locust Avenue	11,927	5,964	50	2	2	40'
Chestnut Avenue	10,562	5,281	50	2	2	40'
Elm Avenue	10,262	5,131	50	2	2	40'
Avenue "N"	12,540	6,270	50	2	2	47.8'
Avenue "O"	12,090	6,045	50	2	2	41.5'
Kings Highway	23,323	11,661	50	2	2	63.3'
Avenue "R"	13,797	6,899	50	2	2	40.5''
Avenue "S"	13,332	6,666	50	3	2	40'
Avenue "T"	14,698	7,349	50	2	2	40'
Avenue "U"	17,566	8,783	50	2	2	40'
Avenue "V"	10,779	5,389	50	2	2	40'
Neck Road	13,943	6,971	50	2	2	40'
B. R. T. Incline	6,524	3,262	50	...	2
Avenue "Y"	13,735	6,868	50	7	2	Yard
Shore Road	22,662	11,331	50	2	2	60'
Neptune Avenue	23,274	11,637	50	2	2	60'

\$268,440 \$134,220

City's Share

50%

R. R. Co's. Share 50%

Bay Ridge Improvement

During the years 1908-09, the

"Joint Account" excavation was	184,968	cu. yds.
"Joint Account" Concrete	24,766	" "
Total "Joint" excavation to date	1,132,477	" "
Total "Joint" Concrete	61,009	" "
Total excavation including additions to Railroad	1,786,439	" "

The above figures do not include the concrete placed in the bridge floors or the parapet walls.

The work above mentioned does not mean that the entire amount was spent simply for the bridges at streets enumerated, but the final grade of the Railroad has been so fixed, that additional streets can be opened from time to time, as the City may require, either above or below the grade of the Railroad, as built by the Commission, without changing the grade of the same. This is outlined very clearly in report of December 31st, 1907.

WORK REMAINING TO BE DONE

Construction of Tunnel at East New York, and elevating railroad from Central Avenue to Borough Line, distance of about one (1) mile, estimated cost, \$1,250,000.

Finishing all work under way between East New York Avenue and New Lots Road, estimated at \$480,000.

Small amount of work on the Manhattan Beach Line; widening embankment; retaining wall Avenue "J" and "K"; connection to Race Track at Neck Road, and grading and paving streets.

Certain proportion of work, between Eighth Avenue and Second Avenue, for which plans have not yet been fully decided upon.

Of the fourteen miles total work of the Bay Ridge Improvement, practically twelve (12) miles of Railroad have been depressed or elevated, or nearly 90 per cent.

Of the total number of bridges at streets, 75 per cent. are completed.

In relation to the amount of money, there has only been about 40 per cent. of the City's appropriation expended to date.

Bay Ridge Improvement

Railroad Bridges	Total Cost	City's Share	City's Per Ct.	Tracks Orig.-New		R. of W. Width
Avenue "G"	63,663	21,780	34	3	5	50'
Utica Avenue	21,278	6,452	30	2	4	35'
Kowenhoven Road (not finished)	27,621	9,534	35	2	4	42½'
Ralph Ave. & Ave. D. (not finished)	30,837	10,450	34	2	4	35'
Wyckoff Avenue	17,914	5,448	30	2	4	35'
Remsen Avenue	19,879	9,939	50	2	4	99'
East 92nd Street	15,117	7,558	50	2	4	99'
East 94th Street	15,471	5,213	34	2	4	35'
Rockaway Avenue	24,266	9,102	37	2	4	42½'
New Lots Road	34,019	12,475	36	2	5	67'

\$778,919 \$271,619

City's Share

35%

R. R. Co's. Share 65%

BRIDGES ON MANHATTAN BEACH BRANCH

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Bay Ridge Improvement

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Of the total number of bridges at streets, 75 per cent. are completed.

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BAY RIDGE IMPROVEMENT AND BRIGHTON BEACH IMPROVEMENT

THIRD PROGRESS REPORT

1910-1913

In submitting a report of the work of the Brooklyn Grade Crossing Commission, attention is called to the previous report of this Commission to the close of the year 1909, in which the work remaining to be done is outlined. This report comprises the work done since that time.

BAY RIDGE IMPROVEMENT—LONG ISLAND RAILROAD

The report of the work during the years 1910 to 1913, inclusive, can be more readily followed if given under four headings.

AVENUE "J" TO MANHATTAN BEACH.

Work on this division was practically completed during the year 1910. All tracks were removed from the surface and from Avenue "N" to Sheepshead Bay the tracks were moved to the new location along the Easterly side of the Brighton Beach tracks and the streets were paved where depressed under the new railroad bridges. The depression of Avenue "U" under the old Manhattan Beach Line was filled in and the street macadamized to its original grade. The principal work done on this section was the completion of the railroad bridges at Avenues "L" and "P." The Commission has been asked to provide a bridge at Voorhies Avenue, but this is not considered necessary until the Avenue is opened and graded West of the railroad to Coney Island Avenue.

Bay Ridge Improvement

SECOND AVENUE TO NEW LOTS ROAD.

The Seventh Avenue bridge was completed during the year 1910, and is the longest bridge erected under the direction of this Commission. It has a length of 272 feet, a total width of 70 feet, including a 44 foot roadway, two 10 foot sidewalks, and two 3 foot pipe galleries. It is built on a skew and on a 3 per cent. grade. During this year floors were also placed on the East 18th Street foot bridge and on the two railroad bridges at Kowenhoven Road and at Avenue "D" and Ralph Avenue.

The Railroad bridge at Sea Beach Crossing was erected and put into service in 1911. This now carries the two tracks of the Sea Beach Railway over the Long Island tracks on a lower grade so as to permit Eighth Avenue being carried over and above both railroads.

The highway bridge at Second Avenue spanning the tracks of the Sea Beach Railway and the Long Island Railroad tracks was built during the latter part of 1911 and in 1912. This bridge is 224 feet in length and total width of 73 feet, also on a 3 per cent. grade.

Itemized bids have been taken for the construction of a joint bridge to carry Eighth Avenue (a new street) over the tracks of the Sea Beach Railway (New York Municipal Railway Corporation) and of the Long Island Railroad at an estimated cost of about \$46,000.00, of which 55 per cent. will be the share of this Improvement.

All grade crossings are now abolished on this section, but additional highway bridges will probably be required at Sixth Avenue and at some street between Nostrand and Ocean Avenues, as the growth of these portions of the city has been rapid. The bridges at Fifth Avenue, Fourth Avenue and Third Avenue will also be rebuilt.

NEW LOTS ROAD TO EAST NEW YORK.

The depression of this section which was started during the year 1909 was completed in 1911, and crossings are now provided at all streets.

Blake Avenue highway bridge, previously reported under construction, was put into service and highway bridges were

erected to abolish the grade crossings at Sutter, Pitkin, Glenmore and Liberty Avenues. Foot bridges were erected, spanning the railroad yard, at Livonia Avenue and at Belmont Avenue.

EAST NEW YORK AVENUE TO BOROUGH LINE.

When completed this section of the railroad will consist of a four track tunnel from a point Southerly of East New York Avenue to a point Northerly from Granite Street, a distance of 3,530 feet. From this latter point the road will pass to an embankment crossing Central Avenue and continue on this embankment to the County Line, a distance of 2,250 feet. No streets are provided for this embankment section, except Central Avenue, as the property to the East of the railroad is practically occupied by the Cemetery of the Evergreens and the Cemetery of the Most Holy Trinity.

The tunnel section is built on a straight line on a new right-of-way, provided by the Railroad Company, from the South portal at East New York Avenue to a point North of Bushwick Avenue and does away with the following grade crossings, which were on the old line:

East New York Avenue.

Atlantic Avenue and the tracks of the Atlantic Avenue Division, Long Island Railroad.

Herkimer Street.

Fulton Street with trolley tracks and Elevated Railroad thereon.

Norman Place.

Broadway with trolley tracks and Elevated Railroad thereon.

Conway Street.

Stewart Street.

Eastern Parkway.

DeSales Place.

Bushwick Avenue.

Aberdeen Street.

Furman Avenue.

It also provides for the future opening of Granite Street, if the City Authorities so desire.

From East New York Avenue to Fulton Street the present railroad tracks are within the lines of Vesta Avenue, which

practically renders this street impassable for vehicular traffic. As soon as the tunnel is placed in service the old tracks will be removed from the surface and the Railroad Company will convey its rights in Vesta Avenue to the City of New York for street purposes.

This section was started by Contractor W. H. Gahagan, Inc., in June, 1912, at Central Avenue, where a four track railroad bridge was erected and put in service and the street lowered and repaved under and adjacent thereto, the railroad being elevated from a point between Pilling Street and Central Avenue to the County Line.

The four track tunnel is completed under East New York Avenue and from the South curb of Fulton Street to a point South of Herkimer Street, with two tubes completed under Atlantic Avenue and under Fulton Street. Two tubes are also completed near the North end for a distance of about 500 feet. The invert and sidewalls are considerably in advance of the roofed tunnel. 29,539 cu. yds. of concrete have been placed on this section, which is 34.8 per cent. of the total yardage; 214,875 cu. yds. of material has been excavated or about 48.3 per cent. of the contract; 281,747 lbs. of reinforcing rods have been used, and 5,400 lineal feet of conduits laid in the walls.

East New York Avenue is repaved with a temporary block pavement and Herkimer Street will be refilled and opened to traffic early in the spring. Atlantic Avenue and Fulton Street are bridged for pedestrian and roadway travel.

Bushwick Avenue and Aberdeen Street are diverted by temporary street construction. All other streets which crossed the railroad are undisturbed, except Furman Avenue, where there is nothing but vacant lots between the railroad and the cemetery fence.

The roof construction of the tunnel has been modified at East New York Avenue and at Atlantic Avenue to support the three existing 48" water mains, which were raised to permit of the construction of the tunnel.

The Railroad Company having planned to elevate its road-bed from the Borough Line to Fresh Pond Road, a distance of one and one-fifth miles, the contract was awarded for this work

at the same time and to the same contractors, as the work under the jurisdiction of the Commission. The surplus material secured from excavation South of the Borough Line was thus provided to elevate the tracks North of the Borough Line as called for in their contract.

GENERAL INFORMATION

The work of the Bay Ridge Improvement extends a distance of fourteen miles of which one and one-half miles is still under construction.

The most important items of completed construction are:

Masonry of all classes	105,000	Cu. Yds.
Foundation Excavation	117,000	“ “
Ordinary Excavation	3,000,000	“ “
Steel Superstructures	15,700,000	pounds (or over 7,500 tons)

PERMANENT TRACK LAID

Main Tracks	138,054	Lin. Ft. or	26	miles.
Yard Tracks	104,310	“ “ “	19½	“

All excavated material has been hauled and deposited in embankments for the elevated portions of the Improvement between Avenue “G” and New Lots Road, Manhattan Beach Junction and Manhattan Beach, and between Central Avenue and Fresh Pond Road, except a small amount for freight yards and industrial sidings.

63 bridges have been constructed under the supervision of this Commission and placed in service. 35 of these are railroad bridges; 3 are foot bridges and 25 highway bridges of which 8 carry double track trolleys. 19 of these were provided at streets and avenues not physically opened at the time of construction.

The total expenditures from the beginning of the work to December 31st, 1913, divided equally between the Long Island Railroad Company and the City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Long Island Railroad Company are as follows:

Brighton Beach Improvement

Construction work, including engineering and incidental expenses	\$2,933,292.30
Administration expenses chargeable to the Bay Ridge Improvement	145,310.96
	<hr/>
	\$3,078,603.26

BRIGHTON BEACH IMPROVEMENT

1910-1913.

The work unfinished on December 31st, 1909, and completed during the year 1910 consisted of erecting railroad bridges, with solid floors at Avenues L and P, regulating, grading and paving intersecting streets and other miscellaneous work made necessary by the Improvement.

The cost of work done during 1910 chargeable one-half to the City of New York and one-half to the Brooklyn Heights Railroad Company is as follows:—

PERMANENT STEEL BRIDGES AT AVENUES L AND P

259 Tons Steel erected and painted	\$17,330.00
966 Cu. Yds. Concrete Masonry	7,801.00
7,552 Cu. Yds. Earth removed from embankments	5,286.00
Reinforced Floors on bridges	6,800.00
Track work made necessary by the erection of bridges	5,002.00
Street work, grading and regulating	12,753.00
	<hr/>
Total.....	\$54,972.00
Grading and regulating at other streets under Railroad Bridges	16,193.00
Repairing and resurfacing retaining walls	4,554.05
Trimming Slopes	711.44

Brighton Beach Improvement

The Commissioners appointed by the Supreme Court to assess the damages to abutting property on Park Place on account of the change of grade of this street, due to the work of the Improvement, presented their report awarding damages chargeable to the Improvement.

The amount, including the expenses of the Commissioners being 12,751.95

The work done during the year 1911 consisted of the erection of fences along the high sidewalks of Avenues K, N, O, U and V \$625.65

Repairing and resurfacing retaining walls..... 5,349.76

Trimming and seeding slopes of the embankment 5,601.18

Repairing wood block pavement on Newkirk and Foster Avenue Bridges 90.91

The work of the Brighton Beach Improvement is practically completed, unless the Commission should decide that conditions in that locality require a bridge at Voorhies Avenue.

The total expenditures to date divided equally between the Brooklyn Heights Railroad Company and the City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Brooklyn Heights Railroad Company are as follows:—

Construction work, including engineering and incidental expenses \$1,652,822.69

Administration expenses chargeable to the Brighton Beach Improvement to Jan. 1st, 1914 43,592.74

\$1,696,415.43

To this there will be added a portion of the amount awarded to Charles Cranford, the contractor for the Brighton Beach work from Church Avenue to Avenue O in his suit against the Brooklyn Heights Railroad Company arising from this contract, when the same is settled on appeal.

BAY RIDGE IMPROVEMENT

FOURTH PROGRESS REPORT

1914-1916

This report comprises the work done during the years of 1914 and 1915 and up to February 1st, 1916.

In the report dated May 19th, 1914, under the heading "East New York Avenue to Borough Line" will be found details regarding the four track tunnel then under construction.

At this writing the tunnel is completed and trains running through it under usual railroad operation.

The work was done by the cut and cover method.

The maximum depth from the original surface of the ground to the sub-grade under tunnel floor is 55 feet—this being at a point approximately at the intersection of the tunnel with Bushwick Avenue.

The tunnel is practically a monolithic reinforced concrete four tube structure—each tube oval in shape, 14 feet in width and a maximum height of $17\frac{1}{2}$ feet from top of rail to roof.

Safety niches have been provided for trackmen, and openings to permit going from tube to tube provided at intervals of about 400 feet.

The tunnel floor is 2 feet thick, roof 18 inches thick, partition walls 2 feet thick, side walls $3\frac{1}{2}$ feet—all measurements taken on axes of tubes.

The first train to go through the tunnel was a special train carrying the Members of the Brooklyn Grade Crossing Commission, Engineers and Long Island Railroad Officials, on October 27th, 1915.

East bound Railroad traffic was transferred from the surface tracks in the tunnel on November 6th, 1915, and West bound

traffic on November 24th, 1915, whereupon the old tracks on the surface were removed and the intersections of the old right-of-way with the streets were temporarily paved or planked.

With the exception of Fulton Street and Broadway, the streets intersecting the cut made for the tunnel were closed during construction and traffic detoured over adjacent streets, or in the case of Bushwick Avenue over a temporary roadway.

The most serious traffic problem was at Eastern Parkway, which being a main thoroughfare between Brooklyn and the outlying parts of Long Island was used very largely by automobiles and auto trucks. This being a part of the parkway system, the Commission conferred with the Park Commissioner and it was decided to detour the traffic as it was thought inadvisable to attempt to maintain such heavy traffic by temporary bridge construction, especially in view of the fact that the surface tracks of the Railroad crossed the Parkway at grade within 120 feet of where the end of a temporary bridge would have to be. The bridge would have been 180 feet in length. For these reasons it was thought best to detour the travel via Norman Place and Conway Street—large detour signs being placed for the guidance of drivers, with watchmen at each end of the detour.

After May 24th, 1915, a second detour was provided for the additional summer travel, via Somers Street and Stewart Street.

The Parkway was closed February 15th, 1915, and was reopened to travel for its full width on November 30th, 1915, over a temporary macadam roadway. The detouring method provided gave complete satisfaction.

Before starting work on the tunnel a permanent intercepting sewer was built on the West side of the cut. Sections of sewers crossing the cut at Herkimer Street, Atlantic Avenue and East New York Avenue were removed and the sewers connected with the intercepting sewer to permanently take the sewage flowing from the West. On the other streets temporary sewers were maintained where necessary during construction, and on completion of the tunnel were rebuilt on the old line and grade.

Except for the 48 inch mains referred to in our previous report, most water and gas mains, electric conduits, etc., were

temporarily maintained or discontinued where possible and all replaced in their old location upon completion of the tunnel.

The large gas main on Bushwick Avenue was temporarily replaced by line laid under the detour road.

Temporary cinder sidewalks and macadam pavements are laid on all streets over the tunnel from Norman Place to Bushwick Avenue inclusive. These streets will be repaved in the spring with permanent asphalt or block pavements and permanent sidewalks provided.

In the tunnel at the South end between Atlantic Avenue and East New York Avenue an island platform was constructed for passenger use.

This platform and stairway were provided in place of the platform formerly existing on Vesta Avenue.

The Railroad Company has planned a new station building at this point.

During the progress of the work a field office was maintained at 1964 Broadway, Brooklyn, New York, on property immediately adjacent to the tunnel cut. The use of this office was discontinued August 1st, 1915, and a smaller place secured for the field men at Atlantic and Snediker Avenues.

Before taking bids for this tunnel work it was estimated that the cost of the work as planned would be one and one-quarter million dollars—that of this amount 25 per cent. would be the cost of the additional construction required to give the Railroad the additional facilities it desired in the way of betterments. It was therefore decided that the Railroad Company should pay 25 per cent. of the actual cost of the construction in lieu of betterments and the balance of 75 per cent. should be divided as the Special Act of the Legislature creating the Commission provides, one-half to the City and one-half to the Railroad Company. This made the total proportion of the Railroad Company $62\frac{1}{2}$ per cent. and the City's $37\frac{1}{2}$ per cent.

The cost of the Tunnel construction work was \$1,203,760.00, apportioned as above stated.

The Railroad Company in addition furnished necessary right-of-way, paying for all property and removing all buildings thereon.

Bay Ridge Improvement

The principal items of construction for tunnel and approaches were:

Concrete	85,467 cu. yds.
Excavation	441,016 " "
Structural Steel	328 tons
Steel Reinforcing Rods	4,576,872 pounds
Five-ply Waterproofing	225,517 sq. ft.
Three-ply Waterproofing	26,488 " "

This Commission is pleased to report that notwithstanding the great depth of the cut necessary, the very large amount of earth excavated and hauled away on surface tracks, the large amount of construction material brought in on the surface tracks, and notwithstanding the many streets crossed by the tunnel at various points, some of them containing elevated roads and trolley lines, the entire work was carried on and completed in a manner satisfactory to the various City Departments, to the traveling public and to the adjacent residents and property owners.

The Commission desires to avail itself in this report of the opportunity to express its appreciation of the efforts made by the members of the Engineering Force and the Contractor in accomplishing this result.

When the Railroad between Nostrand Avenue and Ocean Avenue was re-constructed by this Commission this section of the City was entirely undeveloped, being cultivated farm lands, consequently a bridge between these points was not provided for in the initial layout of the work.

Since then the rapid progress of building in this section has entirely altered the conditions, and in response to a petition by the adjoining property owners and residents supplemented by a request of the Board of Estimate and Apportionment, the Commission has authorized a bridge erected at Bedford Avenue (East 25th Street).

Plans for this bridge were adopted September 7th, 1915, and contract awarded October 5th, 1915, to Merrill Ruckgaber Company, at a cost of \$19,135.00.

The Contractor has placed all the concrete for the column

foundations and for the South abutment and is now awaiting delivery of steel in the early spring.

It is expected that this bridge will be completed ready for service by June 15th, 1916.

The Eighth Avenue Bridge noted in our previous report was completed and put in service in 1914.

The original plans and specifications for the elimination of grade crossings in the Bay Ridge vicinity provided for a depression of tracks at First Avenue, with the building of a viaduct to carry First Avenue above the tracks.

It was expected that this Commission would provide for the building of the First Avenue viaduct in accordance with the provisions of the Law, but the Railroad Company, in developing its yard and increased facilities at the New York Bay terminus of its road, entered into negotiations with the City for the closing of 64th and 65th Streets, between Second Avenue and the Bay, and as a result of these negotiations paid the City for the closing of the two streets and agreed to assume all the cost of the viaduct carrying First Avenue above its tracks and enlarged yard.

A slight depression of the old tracks at First Avenue was necessary in order to carry the First Avenue viaduct over the tracks at a proper clearance height. It was therefore determined by this Commission that the amount which the City should contribute towards the reconstruction West of Fifth Avenue would be one-half of the estimated cost of depressing the railroad from Fifth Avenue to First Avenue—a depression equal to the change of grade at First Avenue (i. e., 3.68 feet) with a corresponding underpinning of the arches at Second, Third and Fourth Avenues, and the Fifth Avenue Bridge.

The Railroad Company pays for all construction at and West of Fifth Avenue, except the amount of \$42,123.82, which was determined as the share to be contributed by the City as per preceding paragraph.

The new bridge at Fifth Avenue over the Long Island tracks was built under the supervision of this Commission at the same time as the New York Municipal Railway Corporation built the Fifth Avenue Bridge over the Sea Beach Railroad.

These bridges are practically one continuous structure as they meet on a common centre pier.

Trolley, wagon travel and pedestrians were detoured over a temporary trestle erected East of and adjacent to the avenue in August, 1914.

The new bridge was completed and placed in service in March, 1915.

The new bridge at Fourth Avenue is a two story structure, built under the supervision of the Public Service Commission by agreement with the Long Island Railroad Company. The first story of the bridge carries the Fourth Avenue subway over the tracks of the Long Island Railroad—while the second story of the bridge becomes the surface of Fourth Avenue.

Plans are now preparing for a bridge at Third Avenue. It is expected that contract for this work will be let in the near future.

The Second Avenue Bridge was built in 1910.

The Commission believes that a highway bridge should be built to carry Sixth Avenue over the tracks of the Long Island Railroad and as previously reported has built the South abutment for this bridge. As this Commission has no jurisdiction over the Sea Beach Railroad (New York Municipal Railway Corporation) immediately adjoining the Long Island Railroad, this bridge should only be built when a similar structure over the Sea Beach road is authorized.

Total disbursements to January 1st, 1916, divided equally between the Long Island Railroad Company and the City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Long Island Railroad Company are as follows:—

Construction work, including engineering and incidental expenses	\$3,889,048.20
Administration expenses chargeable to the Bay Ridge Improvement	171,071.33
	<hr/> \$4,060,119.53
Amount paid by the City	\$2,030,059.76

BAY RIDGE IMPROVEMENT AND BRIGHTON BEACH IMPROVEMENT

FIFTH PROGRESS REPORT

1916-1918

The work done under the supervision of this Commission since February 1st, 1916 (the end of the last progress report) was the replacement of street surfaces disturbed by the construction of the East New York Tunnel; the completion of the Bedford Avenue (East 25th Street) Bridge; and the construction of a bridge at Third Avenue, all as outlined in our report dated February 29th, 1916—in addition to which the Board decided to build a parapet wall at the North Tunnel Portal and across the dead end of Pilling Street, and a parapet wall along the Southerly court yard line of Sixty-first Street extending from Fourteenth Avenue to Eighth Avenue with returns extending from said court yard line to the parapet walls of the Eleventh, Ft. Hamilton and Eighth Avenue Bridges. This parapet wall was a safety requirement, especially necessary in view of the fact that several of the intersecting avenues stopped at Sixty-first Street and that the railroad cut immediately adjacent on the Southerly side of the street is at a considerable depth below the surface of the street.

Bedford Avenue Bridge, which was completed in June, 1916, is a typical highway bridge carrying Bedford Avenue over the depressed four track roadway of the railroad. Its construction involved no particular difficulties as there was no travel to be taken care of—the bridge being erected to provide for a new street crossing, at the request of adjacent residents and property owners and of the Board of Estimate and Apportionment.

The principal work during the period of this report has been the construction of the new bridge carrying Third Avenue across the right-of-way of the Long Island Railroad.

The length of this bridge is 162 feet and of the full width of Third Avenue—eighty feet.

Provision is made for nine railroad tracks underneath and

room for three additional tracks can be provided by the construction of abutment and wing walls at the Southerly end.

The total cost of this bridge was about \$90,000.00 of which the City contributed \$2,700.00, which was one-half the estimated cost for underpinning the old arch to permit lowering the track 3.68 feet as was done at First Avenue.

During the construction of this new bridge travel was not interrupted, except for short periods during the day when the roadway was temporarily blocked for a few minutes by the moving of material across the same.

A temporary roadway was maintained at all times sufficient to permit the operation of a double track trolley and the usual vehicular travel. The pedestrian travel was confined to the temporary sidewalk on the Westerly side of this structure.

The operation of the elevated railroad on Third Avenue was not interfered with and its structure is now permanently supported by the new bridge.

All construction work on both Improvements required by Chapter 507 of the Laws of 1903, and amendments thereto, under which this Commission is working, has been completed—so that there remains practically nothing but the final adjustment by the Commission of accounts between the Long Island Railroad Company, the Brooklyn Heights Railroad Company and the City of New York.

On December 1st, 1916, the Commission notified the City Authorities of these conditions and of its intention to complete the work on or about May 1st, 1917, and at the same time directed the Long Island Railroad Company and the Brooklyn Heights Railroad Company to file on or before January 1st, 1917, all claims against their respective Improvements.

The construction work was practically completed by May 1st, 1917.

In response the Long Island Railroad Company filed its claims under date of December 30th, 1916, amplified under date of February 28th, 1918, as follows:

“First: Land for slopes from Manhattan Beach Junction to Neptune Avenue; Liberty Avenue to East New York Avenue, and between Central Avenue and the Borough Line. The exact

amount cannot be determined upon until your Board finally approves the various bills for purchases and apports the expense.

Second: The cost of embankment on the line to Manhattan Beach. The arrangement with the Board was at cost not to exceed 20 cents per cubic yard. The Company's bills were paid upon a basis of 18 cents per cubic yard, and as the construction expense for this work amounted to more than 20 cents per cubic yard, the Company claims the difference or 499,663 cubic yards at 2 cents—\$9,193.26.

Third: When the land for slopes from Eighth Avenue to New Lots Road was in the process of settlement, the Special Committee appointed by your Board temporarily excluded the value of the buildings on the properties which amounts to over \$15,000. Your Board is requested to adjust this matter as the Railroad Company feels that it should be included in Joint Account expenses, and is, therefore, a proper claim.

Fourth: The right of way and tracks of the Canarsie Railroad, extending from East New York to New Lots Road, parallel and adjacent to the right of way of the Manhattan Beach, and occupying the surface of the street and the ground, prevented the elimination of the grade crossings through that section, as the Grade Crossing Law did not extend to or cover the property of that Company. In order that the work might go on, The Long Island Railroad Company entered into an agreement with the Brooklyn Rapid Transit Company, by which the latter should acquire the Canarsie Railroad and should elevate that portion of the tracks extending from Pitkin Avenue to a point below New Lots Road, and giving its consent to the depression of the tracks of the Manhattan Beach, and the placing of supporting walls upon the right of way of the Canarsie, and also surrendering to the Long Island that part of the right of way of the Canarsie extending from Pitkin Avenue to Atlantic Avenue, and any interest that the Canarsie might have in the old right of way north of Atlantic Avenue. To enable the Brooklyn Rapid Transit interest to carry out this arrangement, the Long Island contributed the sum of \$136,000, and the company thinks that some portion of this amount should be chargeable to Joint Account, and is

Bay Ridge Improvement

therefore a proper claim, especially since the work could not be carried on until the Canarsie Railroad tracks had been removed from the surface of the street."

Details of these items were later presented and a Committee of the Board is now considering the first and fourth items. A portion of the second was disallowed in accordance with an opinion of the Corporation Counsel denying the legal liability of the City. The third item has not yet been finally concluded.

Total disbursements to March 1st, 1918, divided equally between the Long Island Railroad Company and the City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Long Island Railroad Company are as follows:—

Construction work, including engineering and incidental expenses	\$4,084,732.02
Administration expenses chargeable to the Bay Ridge Improvement	193,974.18
	<hr/>
	\$4,278,706.20
Amount paid by the City	\$2,139,353.10

The limit of the City's share of the work of the Bay Ridge Improvement was fixed at one-half the cost of the work, not including betterments and not to "exceed the sum of two and one-half million dollars, except that such limit of cost shall be increased if necessary so as to include one-half the cost of viaducts or bridges constructed across streets or avenues not yet legally opened, intersecting the right-of-way of the railroads affected by the Bay Ridge Improvement as now or hereafter located."

It is noted that the aggregate of all disbursements made by the Commission on this account, together with one-half of all claims presented by the Railroad Company, whether they may be hereafter approved or rejected, will be considerably within the limit of two and one-half million dollars.

In the above stated account is included the cost of bridges built to take care of the then future opening of twenty-eight streets or avenues, in addition to abolishing the then grade crossings, forty-one in number.

At three of these streets foot bridges only were provided—at nine highway bridges were built carrying those streets over the depressed railroad, and sixteen railroad bridges were built that streets could be later opened through those sections where the railroad was elevated on an embankment.

BRIGHTON BEACH IMPROVEMENT

The construction work on the Brighton Beach Improvement has been completed for several years—but during the past year vouchers have been passed covering the cost of certain work done by Charles Cranford. These payments were not made at the time of construction on account of pending litigation between Charles Cranford and the Brooklyn Heights Railroad Company arising out of their contract. The matter has not been fully settled—but payments were made on the basis of a decision of the Appellate Division—Charles Cranford continuing his appeal to the Court of Appeals, claiming additional moneys.

On December 23rd, 1916, the Brooklyn Heights Railroad Company notified the Commission that its Comptroller "has (or will prior to January 1st) filed any bills or claims which we may have against the Brighton Beach Improvement' except bills for land slopes.

The claims filed were:—

For interest on the Cranford judgment	\$26,199.59
For costs, disbursements and services of Attorneys and Witnesses in Cranford suit	6,235.46

which claims had already been disallowed by the Commission in accordance with an opinion of the Corporation Counsel, saying they could not be legally charged to the Improvement.

There were also claims

For Pilots, etc.	\$ 292.50
For patrolling tracks	1,894.20
For constructing wooden curb	2,089.91

which items the General Superintendent of the Commission had reported were not proper Improvement charges.

On or about June 18th, 1917, the Brooklyn Heights Railroad Company served summons and complaint on members of the

Brighton Beach Improvement

Commission in a suit brought to compel audit by the Commission of the above five claims and payment by the City Authorities of one-half of said amounts with interest. The papers have been referred to the Corporation Counsel for such action as he deems proper.

In addition to those claims the Brooklyn Heights Railroad Company on March 31st, 1917, presented bill in detail for land for slopes, aggregating \$96,183.13 and on April 23rd, 1917, the Railroad Company's Comptroller wrote a letter withdrawing said bill and offering one for \$121,332.04 to supersede the prior bill.

The Commission has no knowledge of any further claims to be presented against either Improvement, other than expenses of the Commission.

Total disbursements to March 1st, 1918, divided equally between the Brooklyn Heights Railroad Company and the City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Brooklyn Heights Railroad Company are as follows:

Construction work, including engineering and incidental expenses	\$1,698,552.43
Administration expenses chargeable to the Brighton Beach Improvement	58,214.35
	<hr/>
	\$1,756,766.78
Amount paid by the City	\$ 878,383.39

The limit of the City's share of the work of the Brighton Beach Improvement was fixed at one-half the cost of the work, not including betterments and not to exceed the sum of one million dollars.

BAY RIDGE IMPROVEMENT

FINAL REPORT

1918

Supplementing the report of March 1st, 1918, the Commission decided on the first item of the pending claims of the Long Island Railroad by approving all the items of the bill for land for slopes, as presented, except seventeen items. For these items the Commission allowed \$37,136.05 as the proper joint account charge, while the bill of the Railroad Company was for \$61,674.96. This allowance was protested by the Long Island Railroad Company, the Company reserving its legal rights to the amount not allowed by the Commission.

The third item of the pending claims was not allowed.

On the fourth item of the claim, the Commission allowed the first two items of the bill presented but refused to approve the third item of this bill, amounting to \$65,863.52, as in its opinion there was no legal claim for this item.

Total disbursements to April 30th, 1918, divided equally between the Long Island Railroad Company and The City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Long Island Railroad Company are as follows:—

Construction work, including engineering and

Incidental expenses \$1,249,324.37

Administration expenses chargeable to the Bay

Ridge Improvement 196,222.64

\$1,445,477.01

Amount paid by the City \$2,222,738.50

A few small bills for current expenses will be incurred subsequent to the printing of this report.

In addition to removing all grade crossings (and providing for the future opening of streets without grade crossings) along about twenty-one (21) miles of double track railroad many permanent improvements of great public advantage have resulted.

Bay Ridge Improvement

Among these may be mentioned in particular the laying out of new and enlarged local freight delivery yards providing adequate freight deliveries for the future,—the construction of the large terminal freight yard at Bay Ridge with float bridges enabling car load freight to be put on car floats for transfer to other terminals,—also enabling this branch of the Long Island Railroad to become a through freight line in connection with the New York Connecting Railroad, between New England and the South and West.

In this connection the following extract from a letter of President Ralph Peters of the Long Island Railroad is of interest:

"I desire to report for the information of the Commission, that the Bay Ridge Line, upon which the grade crossings have been removed under the direction of the Commission, has been put in operation under a trackage arrangement between the Long Island, New York Connecting, and New York, New Haven & Hartford Railroad Companies, by which the line is used as a part of the system for interchanging freight between the New Haven and the Pennsylvania Railroads via Hell Gate Bridge and the Bay Ridge float bridges. The service was inaugurated on January 17, 1918, and has continued uninterruptedly since, being gradually increased each month.

"The development of this road under the direction of the Grade Crossing Commission, has added another great transportation facility to Brooklyn and Greater New York, one that will give large service in the distribution of fuel, building material, supplies, and general freight traffic of the City, as well as for the interchange of traffic between the two great Trunk Lines. This was only made possible as a result of the work of the Grade Crossing Commission in eliminating the crossings on this road."

These improvements were paid for wholly by the Railroad Company at an expense of about six million dollars. This amount is in addition to the Railroad's share of the expense of the grade crossing elimination, making a total cost to the Railroad of over eight million dollars for the work done in the Borough of Brooklyn.

BRIGHTON BEACH IMPROVEMENT

FINAL REPORT

1918

In reference to the claim of the Brooklyn Heights Railroad Company for land for slopes, the Railroad Company's Comptroller withdrew said bill, substituting a bill dated April 23, 1918, for \$109,583.13 to supersede the prior bill.

The Commission allowed all the items on this bill as presented except ten. For these items the Commission allowed \$22,458.36 instead of \$39,848.99 as billed.

This allowance was protested, the Company reserving its legal rights for the amount not allowed by the Commission.

Total disbursements to April 30th, 1918, divided equally between the Brooklyn Heights Railroad Company and The City of New York, and exclusive of amounts for betterments and improvements paid wholly by the Brooklyn Heights Railroad Company are as follows:

Construction work, including engineering and incidental expenses	\$1,790,724.93
Administration expenses chargeable to the Brighton Beach Improvement	58,872.40
	<u>\$1,849,597.33</u>
Amount paid by the City	\$924,798.66

A few small bills for current expenses will be incurred subsequent to the printing of this report.

In addition to removing all grade crossings (and providing for the future opening of streets without grade crossings) the Railroad Company increased its trackage—providing for express as well as local service—and built new and commodious stations.

All of these improvements were paid for wholly by the Railroad Company at an expense of over \$820,000. This amount is in addition to the Company's share of the expense of the grade crossing elimination, making a total cost to the Brooklyn Heights Railroad of over \$1,744,000.

The photo reproductions given on the following pages show a few of the changes made on the Long Island Railroad.



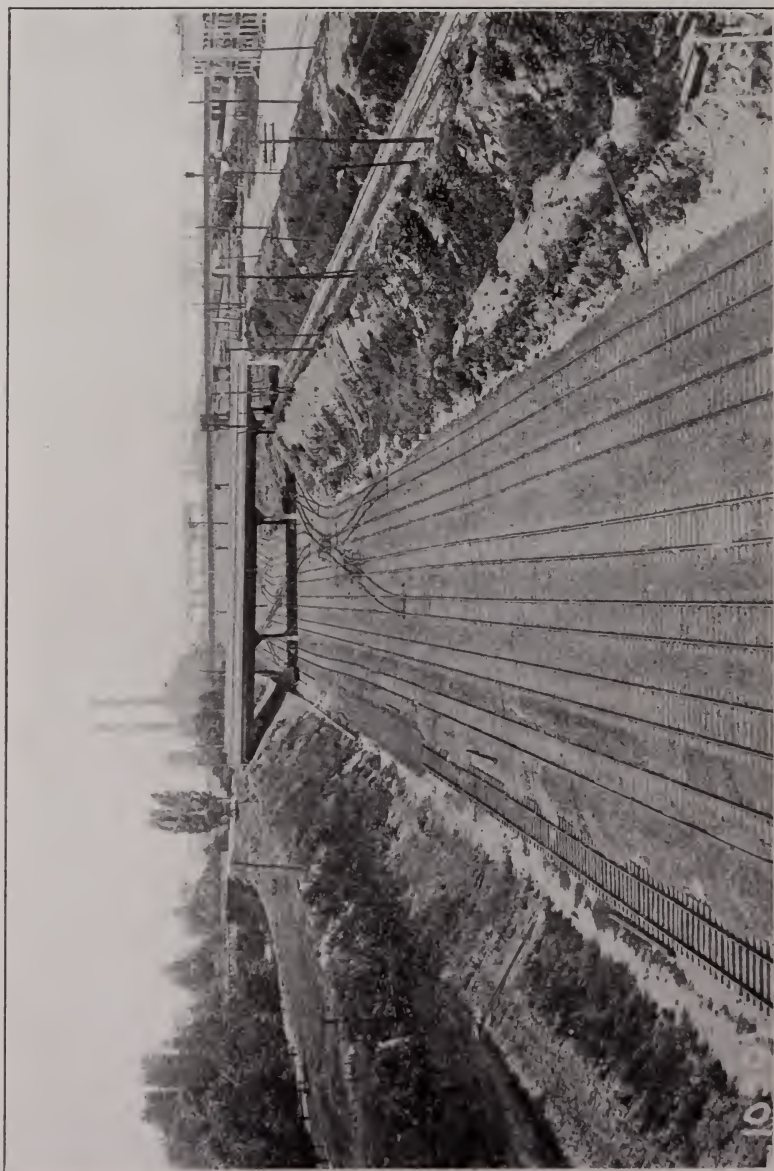
Bay Ridge Transfer Bridges built by Long Island Railroad.



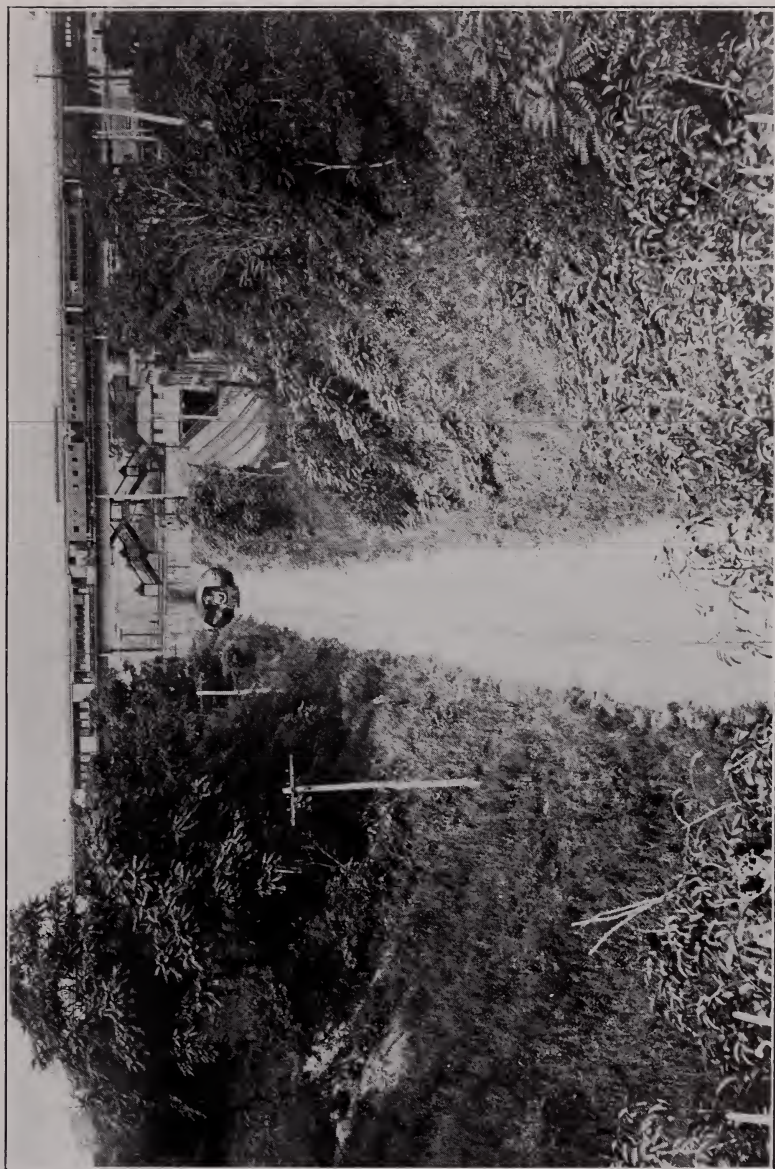
Bay Ridge Terminal Yard. Transfer bridges in background.



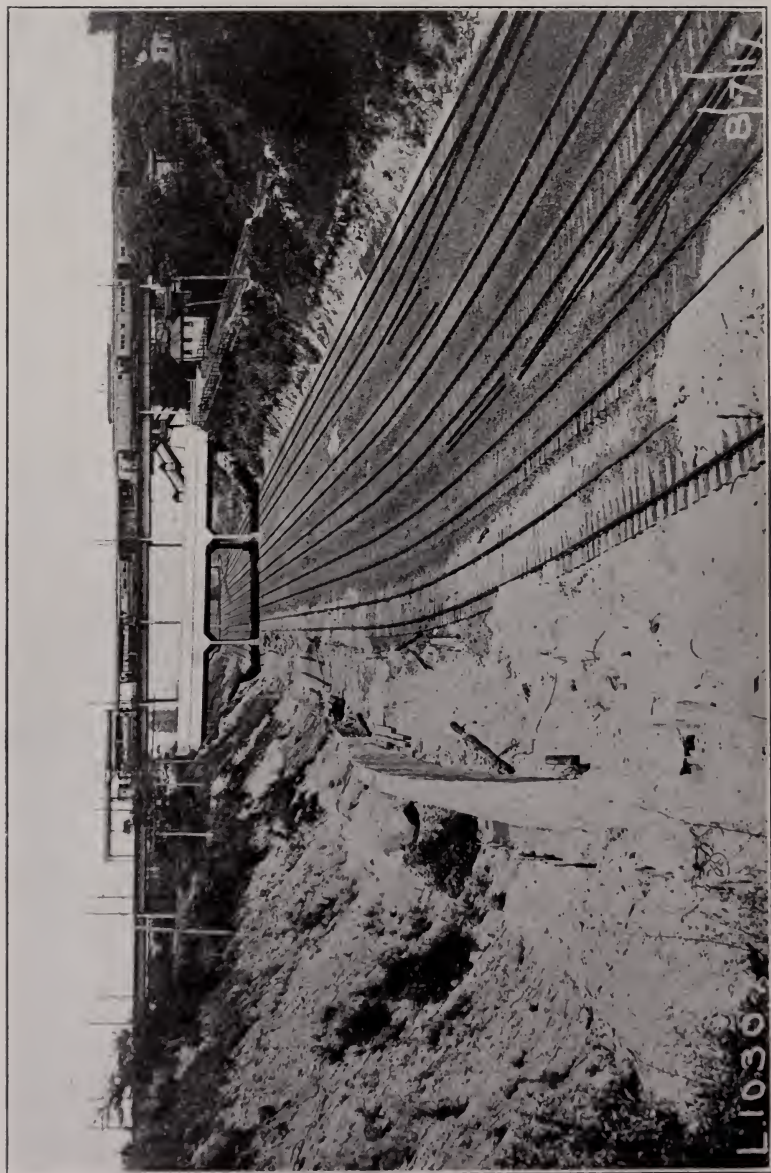
First Avenue Viaduct Crossing Bay Ridge Terminal Yard.



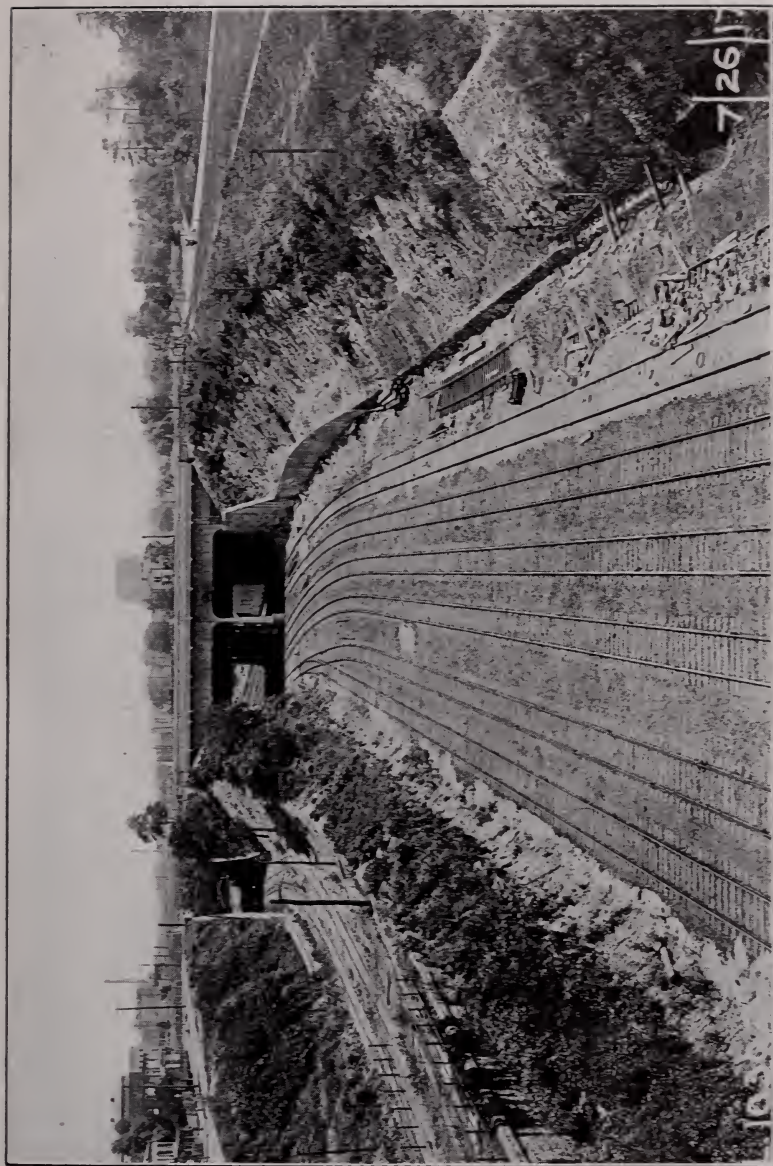
View from Third Avenue Bridge showing Second Avenue Bridge, First Avenue Viaduct, and New York Bay in distance.



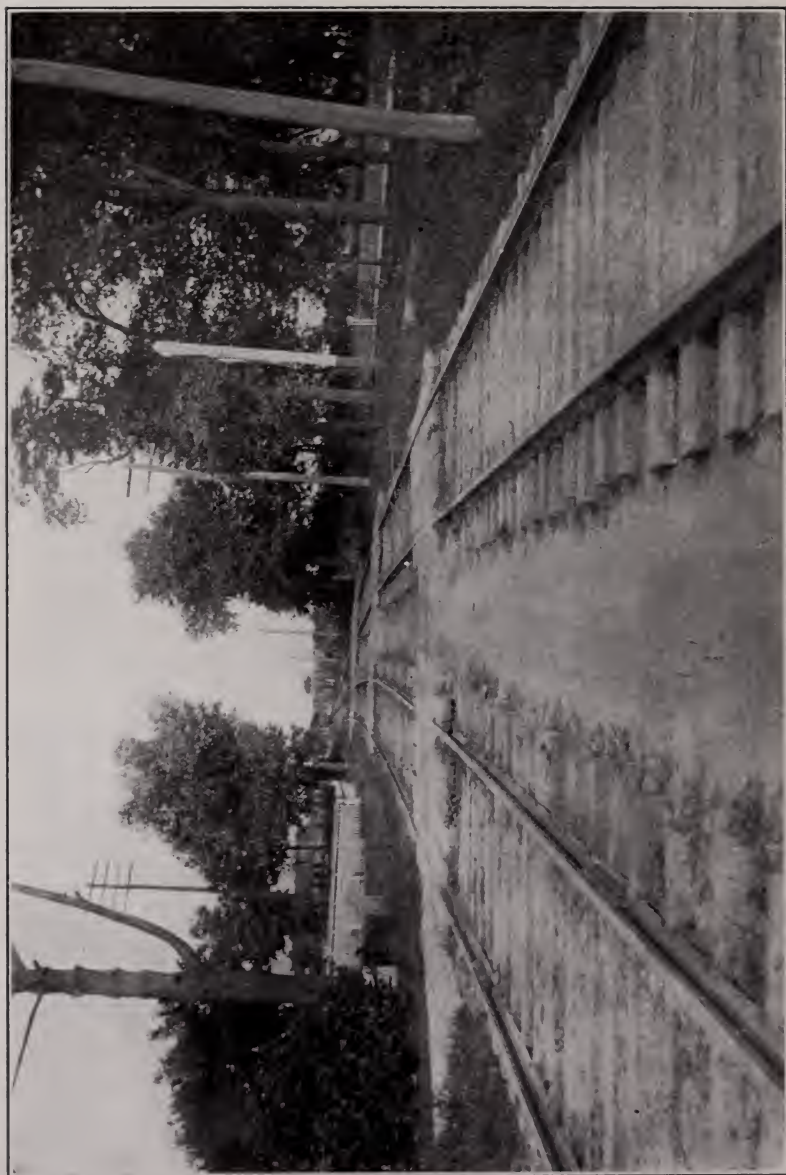
Long Island Railroad in cut showing Third Avenue Arch and Elevated Railroad before change.



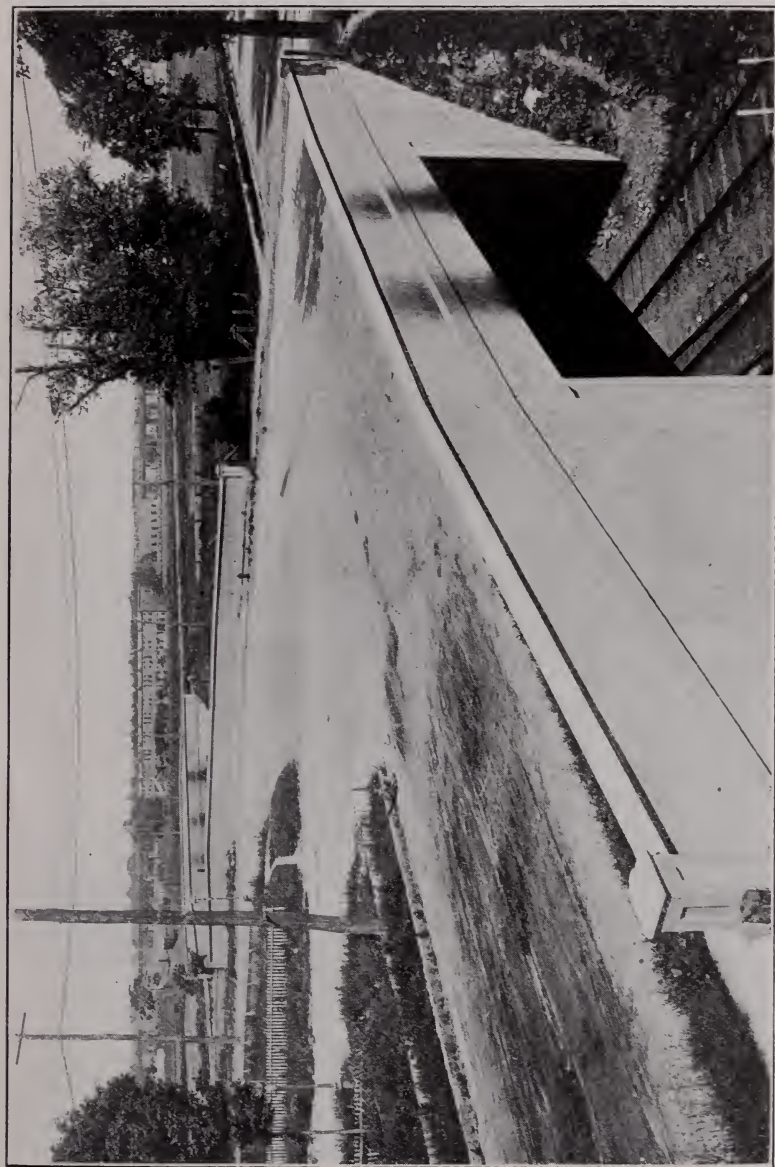
Third Avenue—Same location as preceding picture reconstructed.



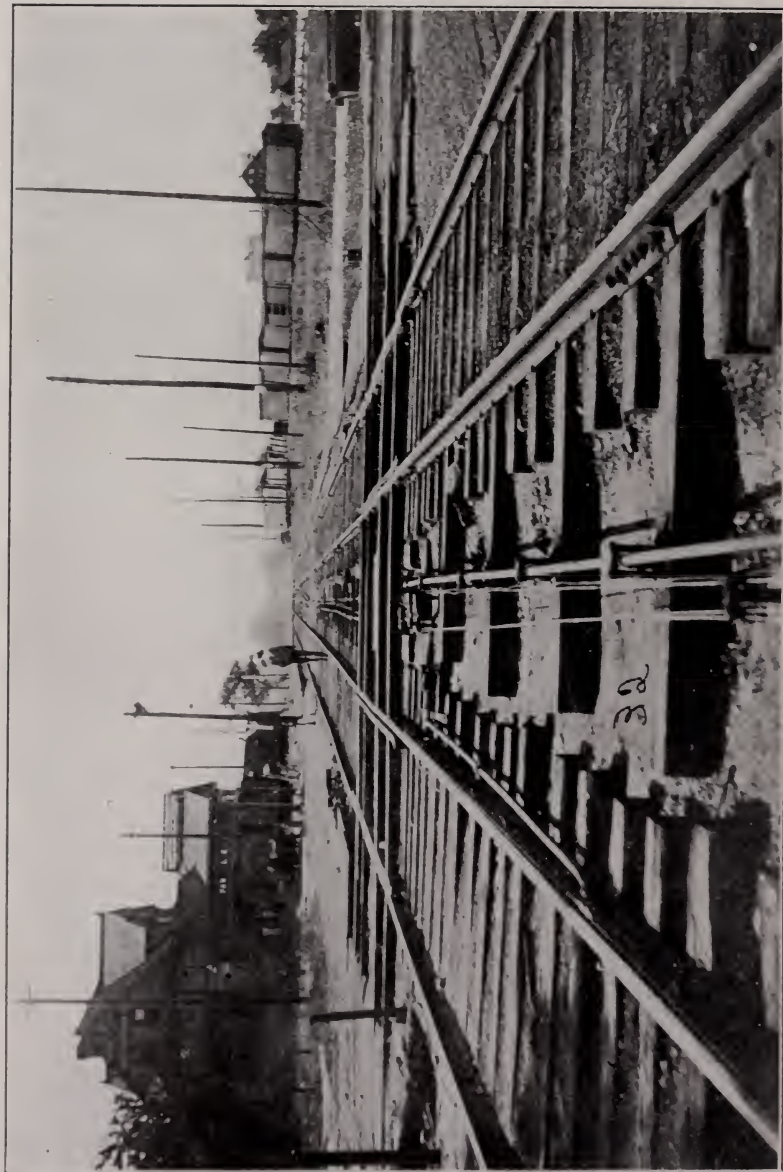
New Fourth Avenue Bridge over Long Island Railroad. Fourth Avenue Subway is in the upper portion of this bridge immediately under the street.



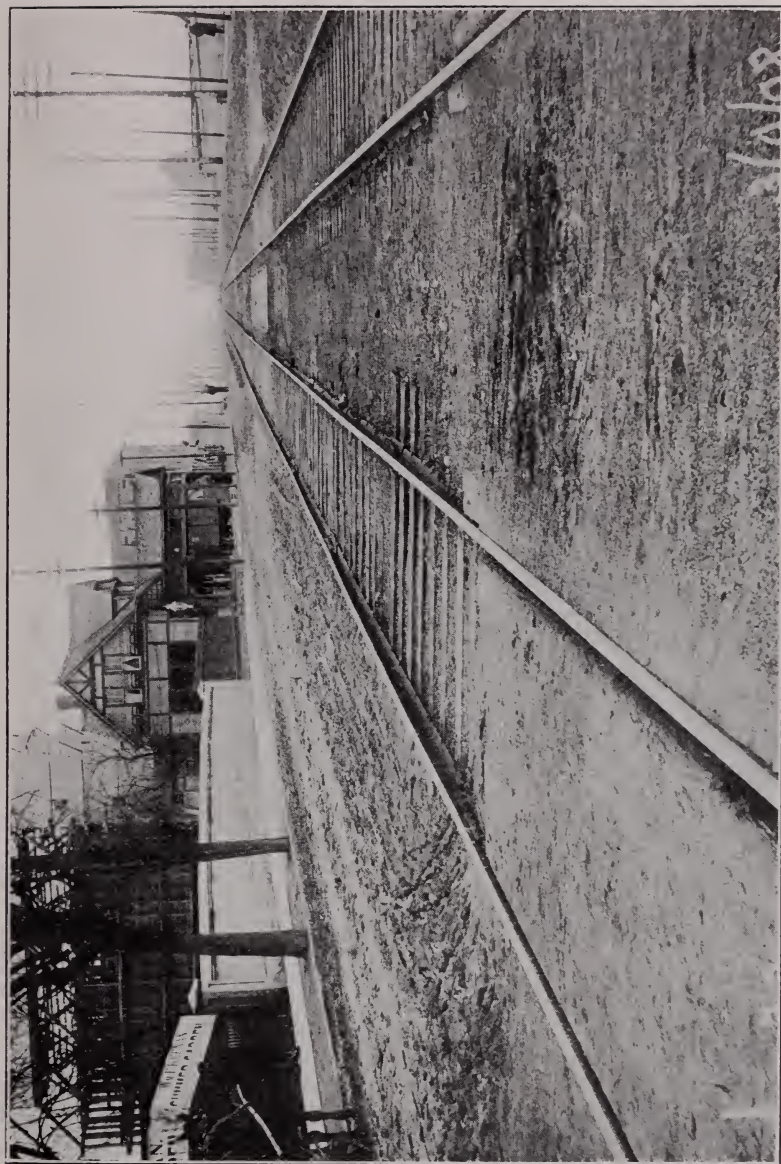
Long Island Railroad before change showing crossings of 53d Street, old New Utrecht Road, and 18th Avenue.



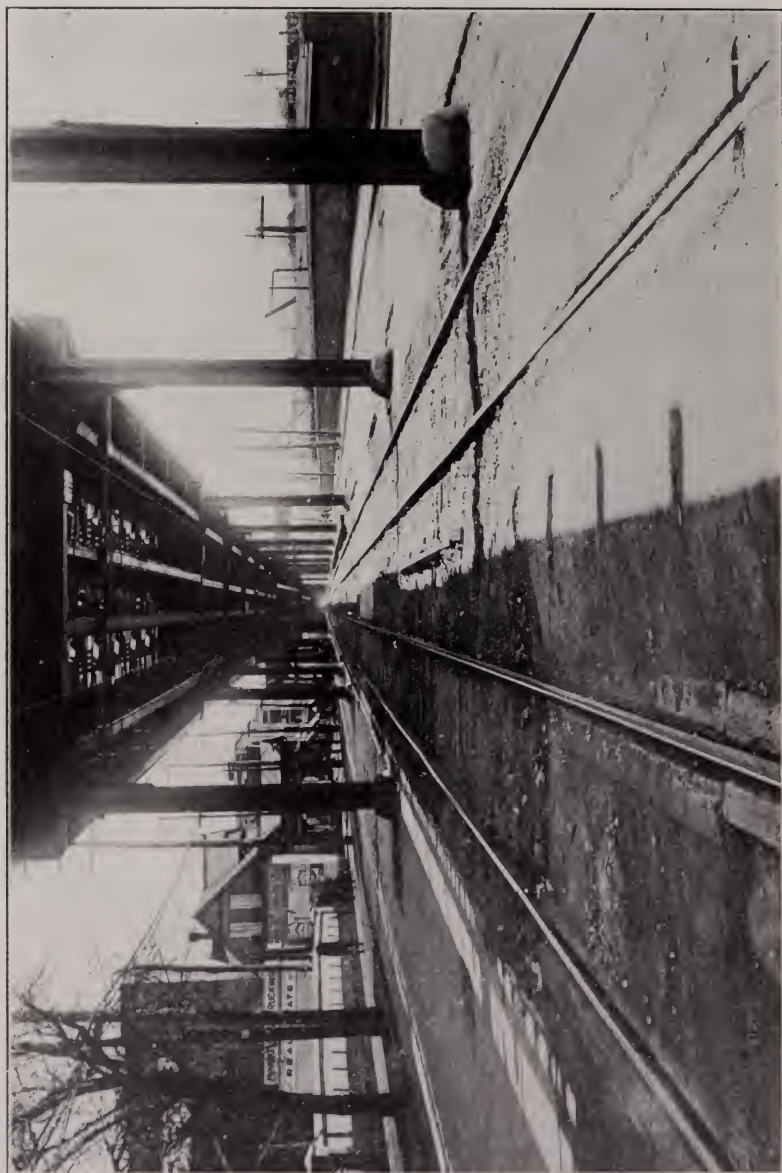
53d Street—Same point as preceding picture. Railroad depressed.



Gravesend Avenue looking south before change. Tracks of Prospect Park and Coney Island Railroad in Gravesend Avenue crossing Long Island Railroad tracks. 1903.



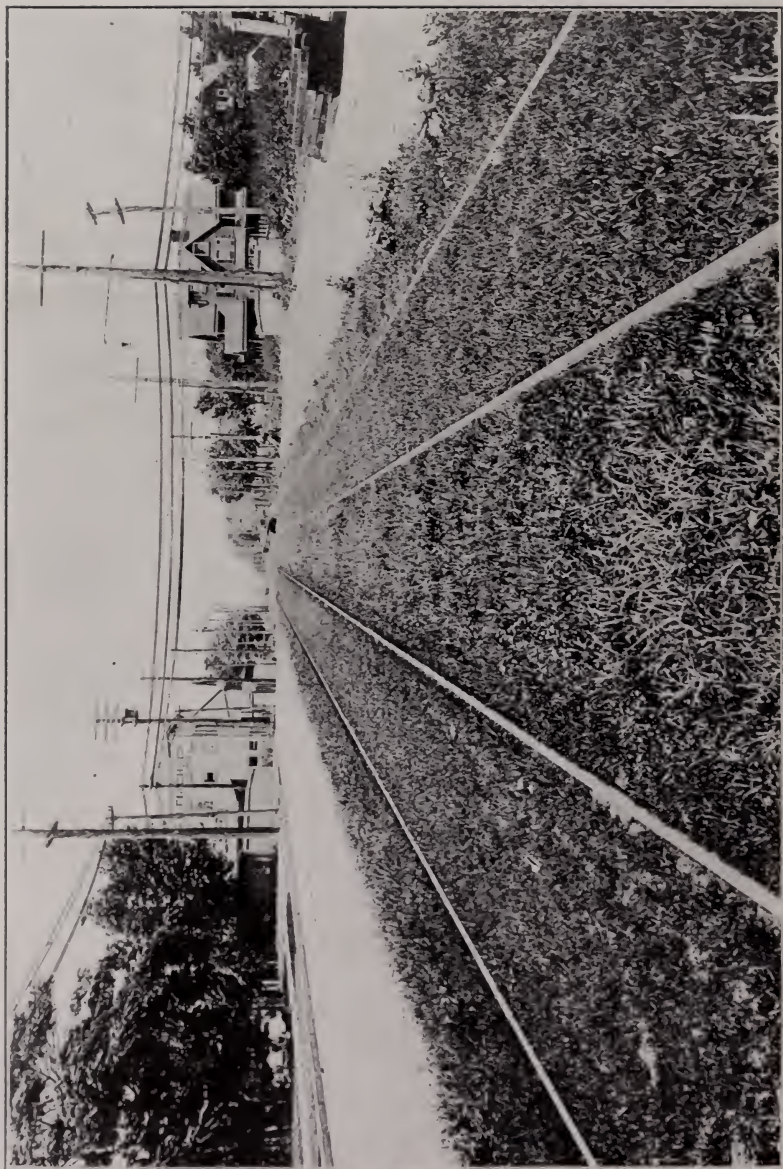
Gravesend Avenue same as preceding picture. Long Island Railroad underneath. 1908.



Gravesend Avenue—Same as preceding picture with new Rapid Transit Elevated Structure, 1918.



Coney Island Avenue showing Long Island Crossing.



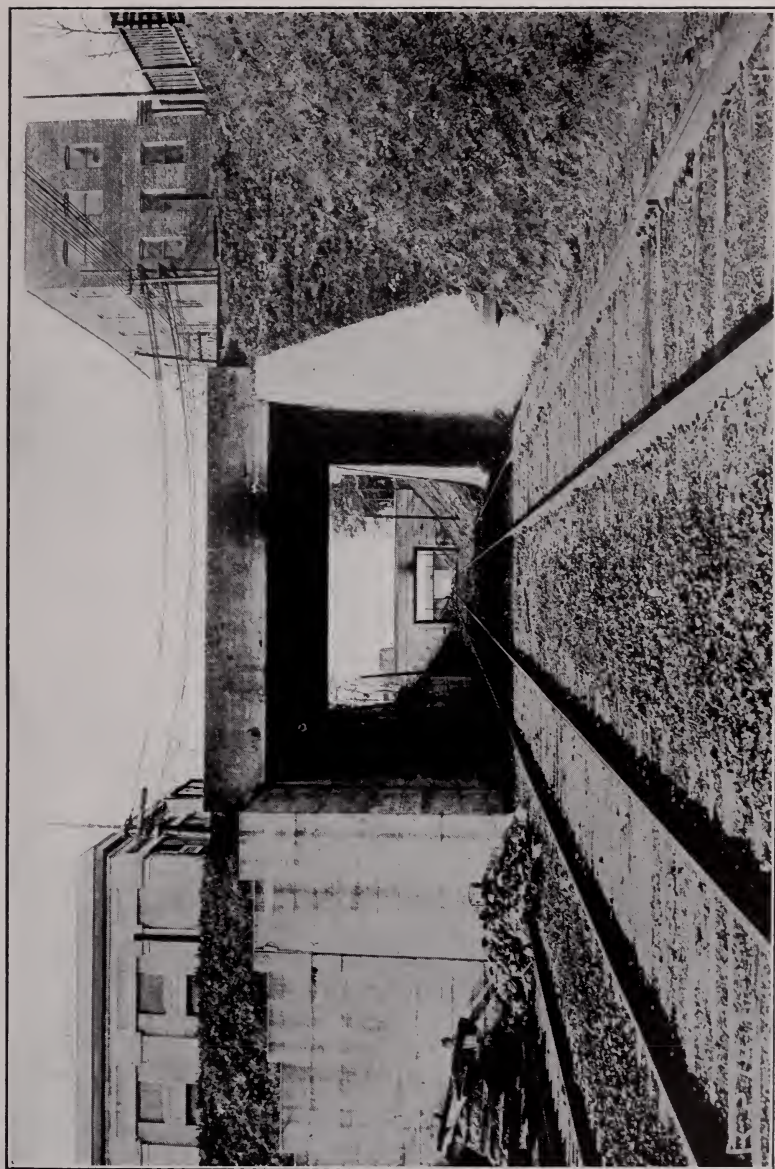
Coney Island Avenue—Same as preceding picture. Railroad underneath.



Same crossing as preceding picture. Railroad depressed. Bridge carrying Coney Island Avenue.



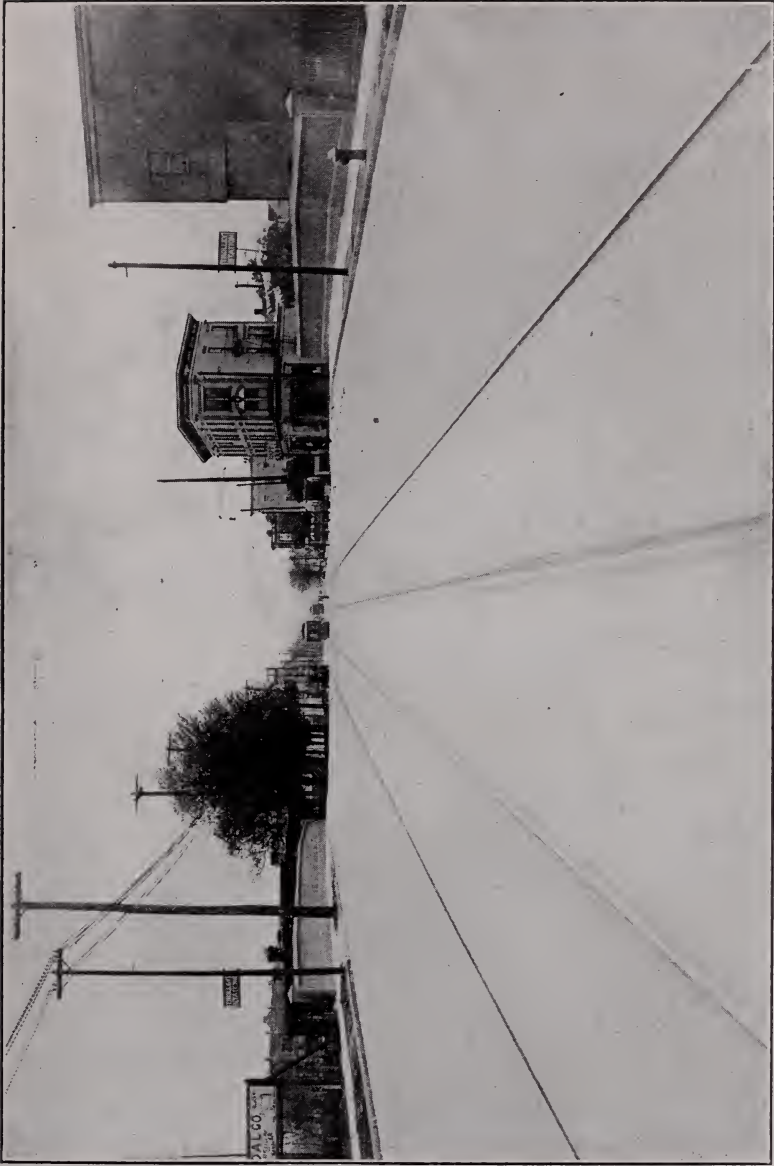
Long Island Railroad on Bridge, Brighton Railroad below before change.



Same crossing as preceding picture. Brighton Railroad on Bridge. Long Island Railroad below.



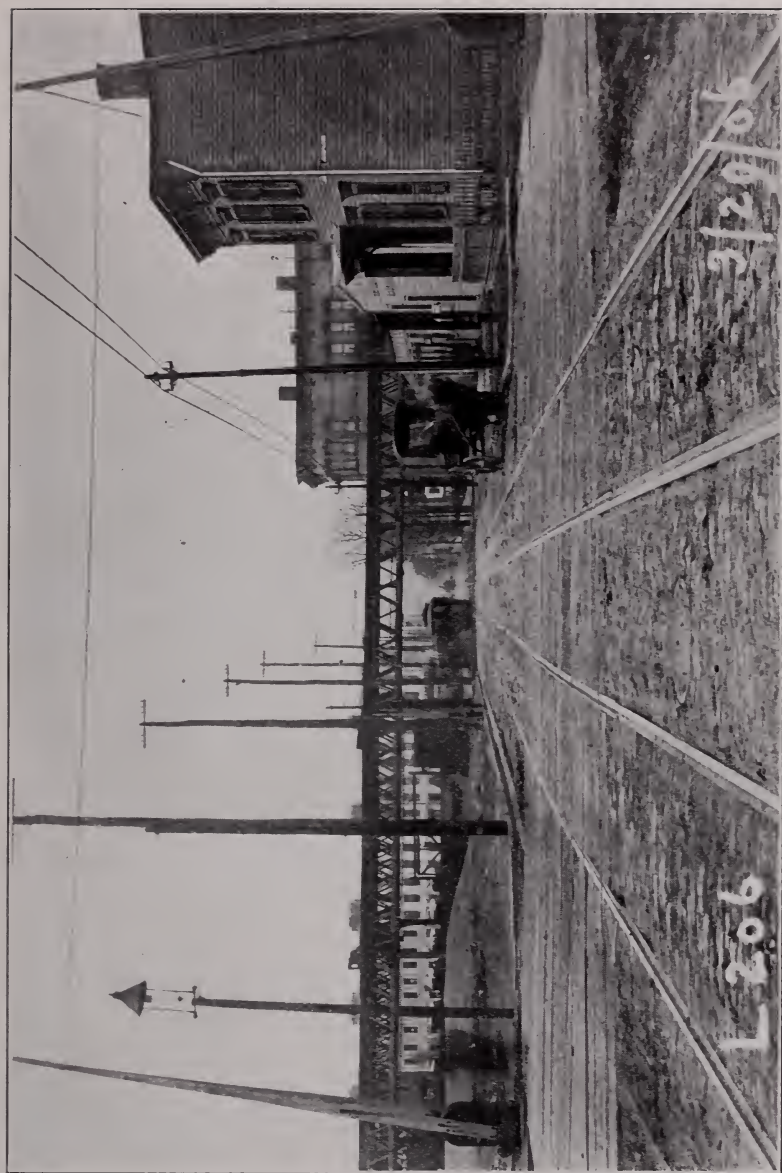
Flatbush Avenue (near Vanderveer Park.) Long Island Railroad Crossing.



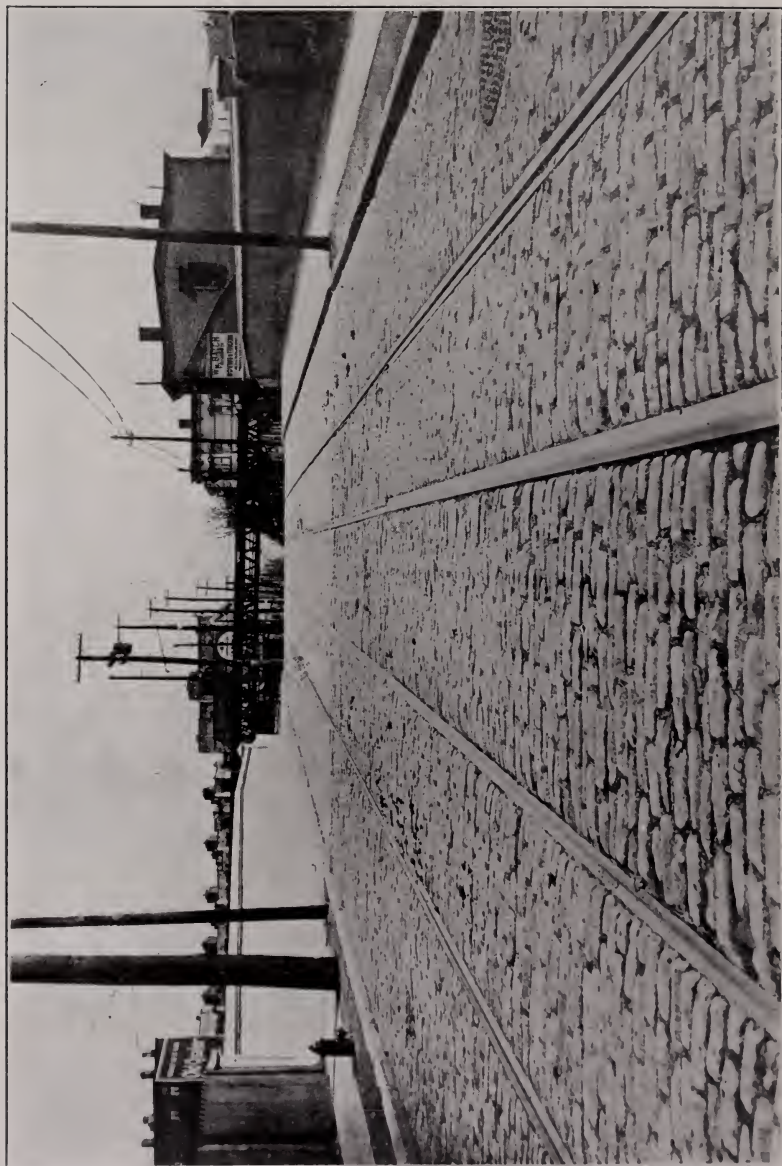
Flatbush Avenue—Same as preceding picture. Railroad underneath street.



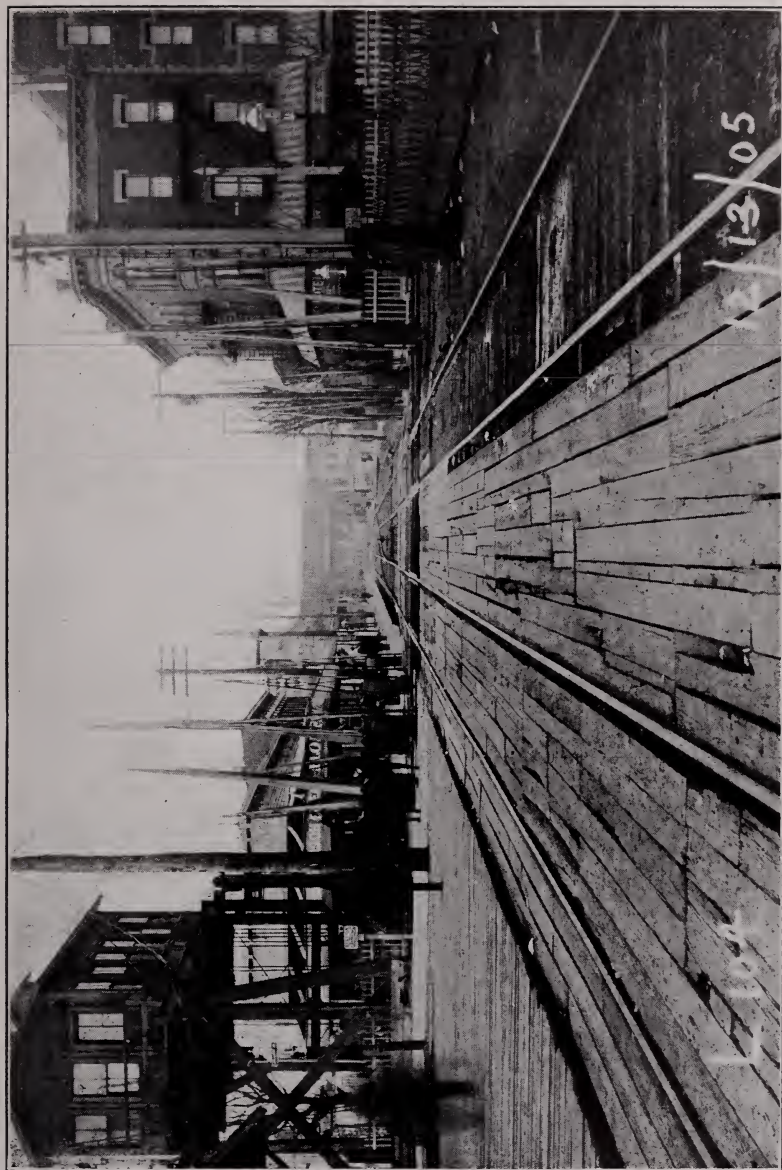
East New York—View of yard from Belmont Avenue, looking North. Canarsie Elevated Railroad on right.



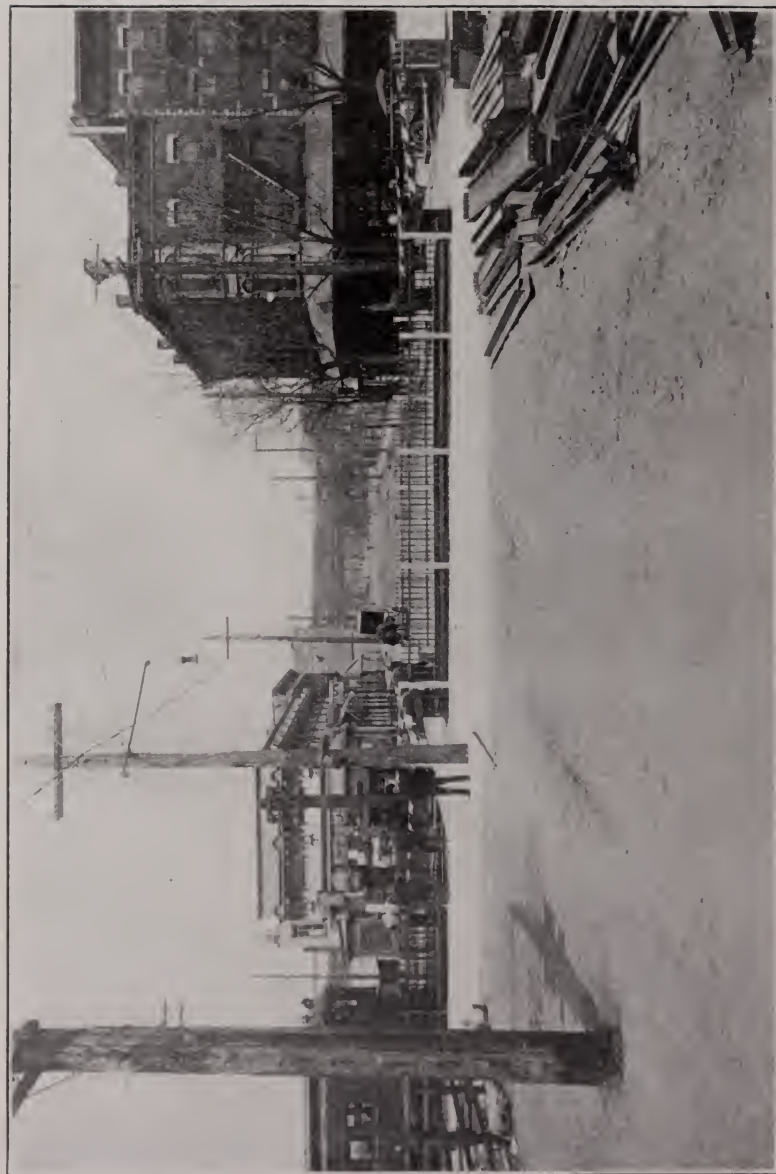
Liberty Avenue, East New York, Long Island Railroad crossing trolley tracks.



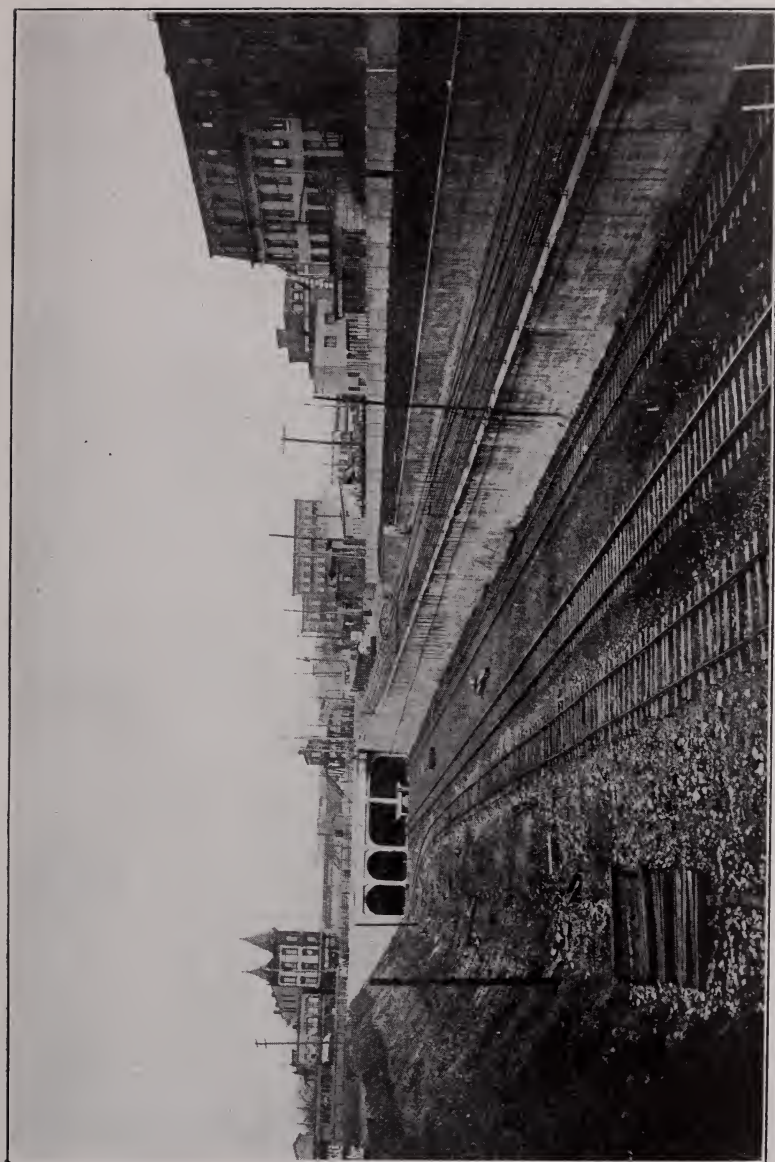
Liberty Avenue—Same as preceding picture. Railroad underneath.



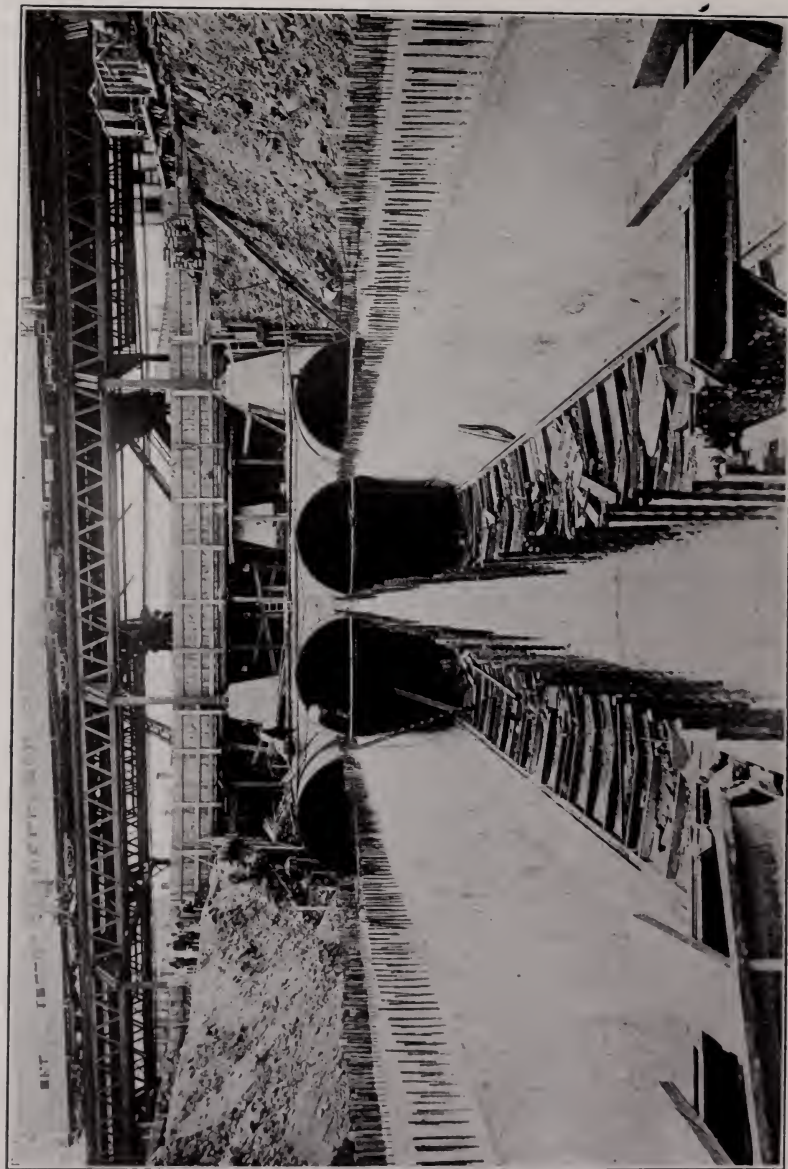
East New York. Long Island Railroad on Vesta Avenue—crossing Atlantic Avenue and track thereon of Long Island Rail-
road. In the summer season 400 trains per day crossed at this point.



East New York—Same point as preceding picture. Tracks removed from Vesta Avenue and placed in new Tunnel shown on succeeding pictures. Tracks not removed from Atlantic Avenue.



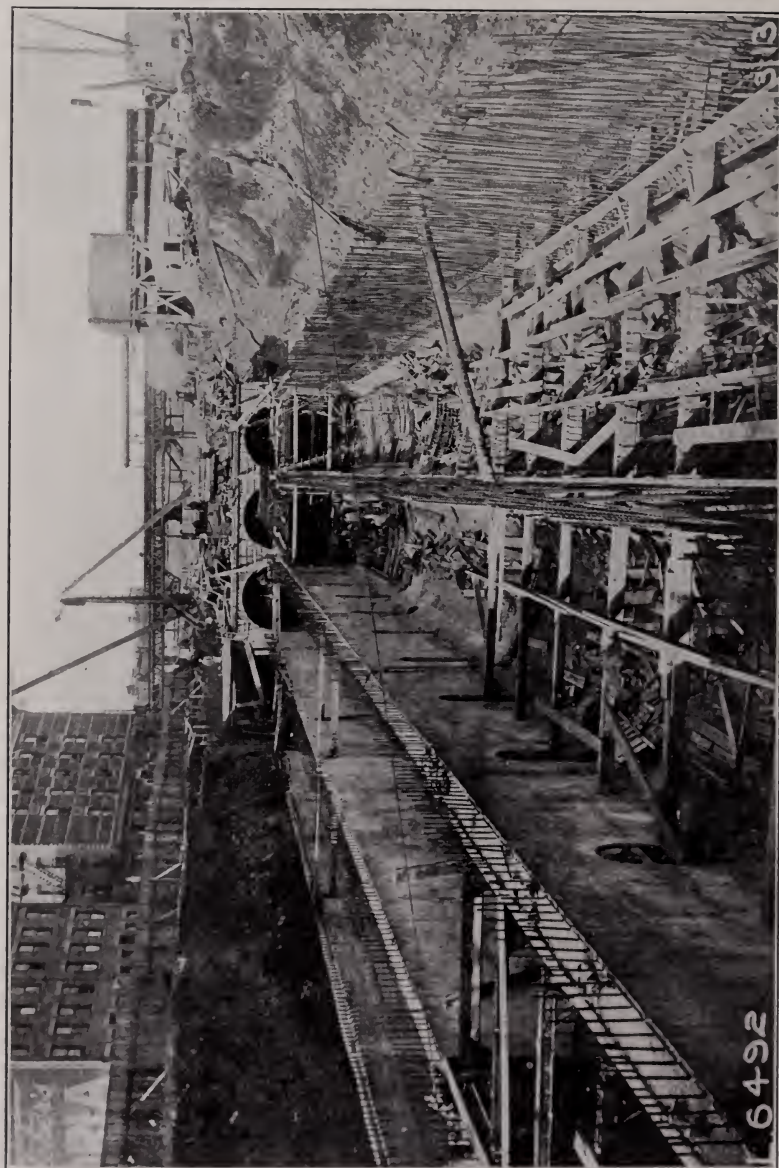
East New York—South Portal of Tunnel adjacent to point shown on preceding picture.



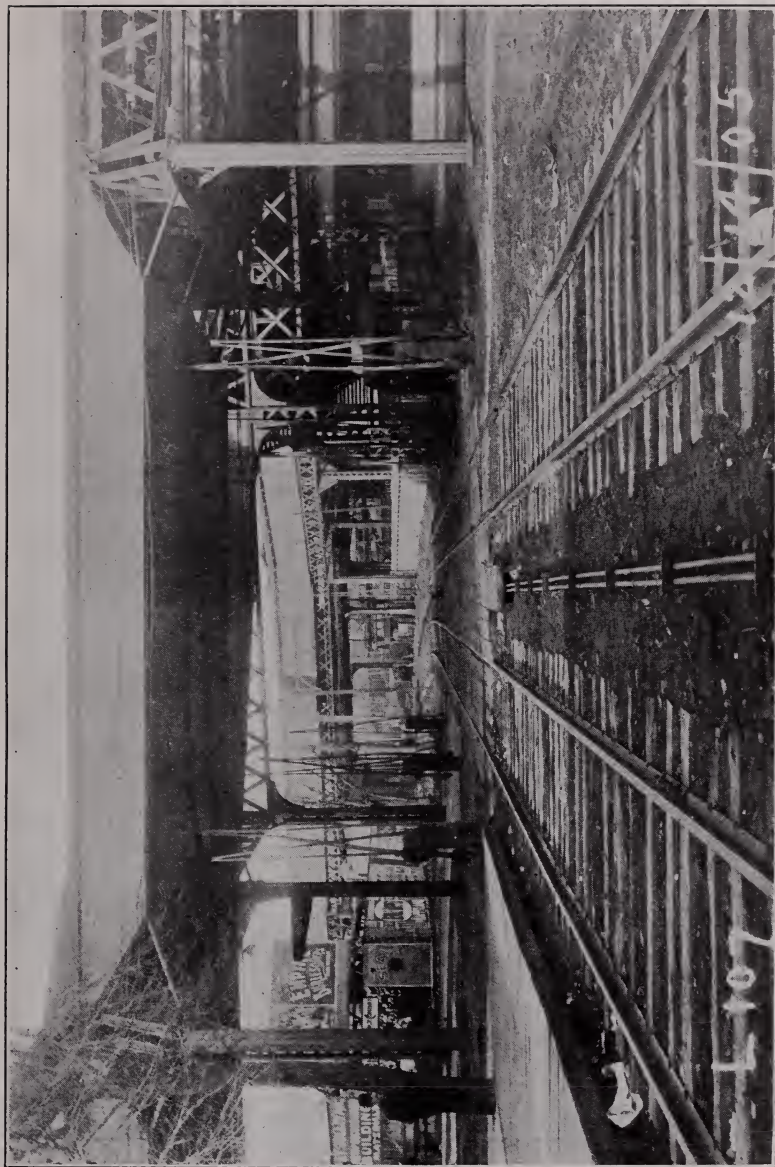
East New York Tunnel—construction under Fulton Street. Street traffic, Trolley and Elevated service maintained at all times during construction. Re-inforced concrete.



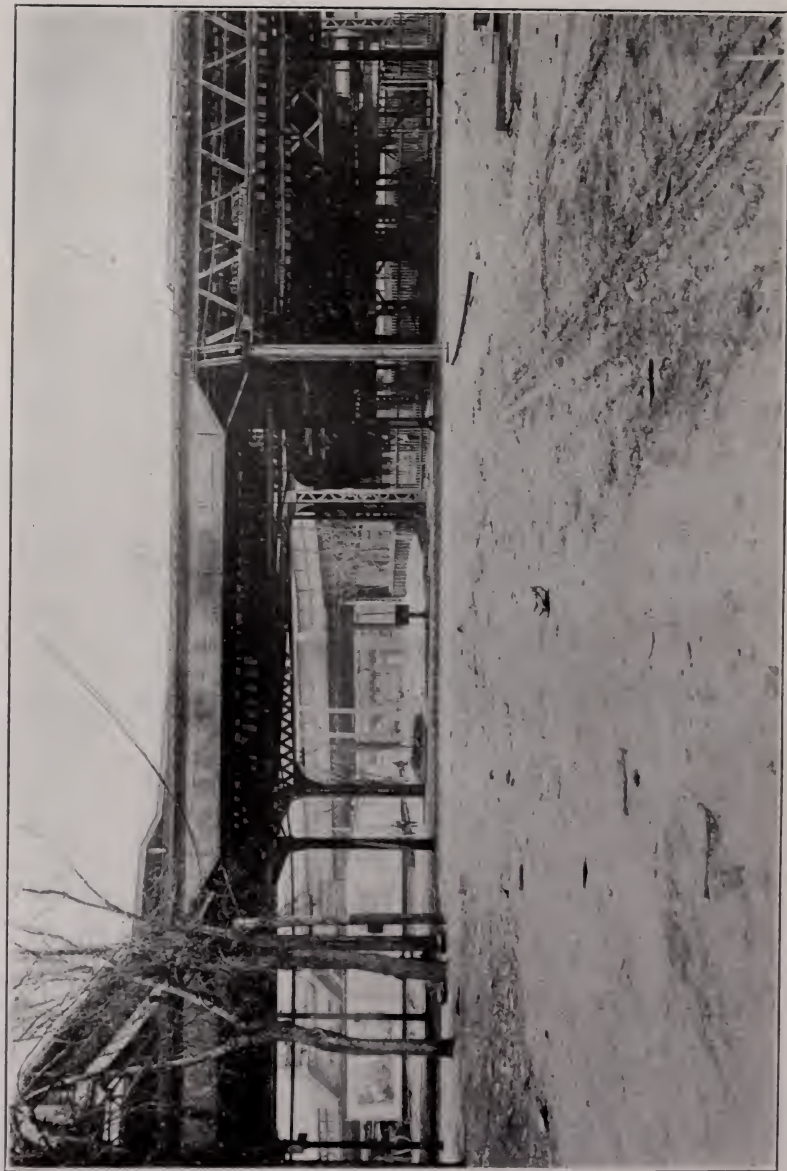
East New York Tunnel. Roof forms in place—re-inforcing rods placing preparatory to pouring concrete roof of tunnel.



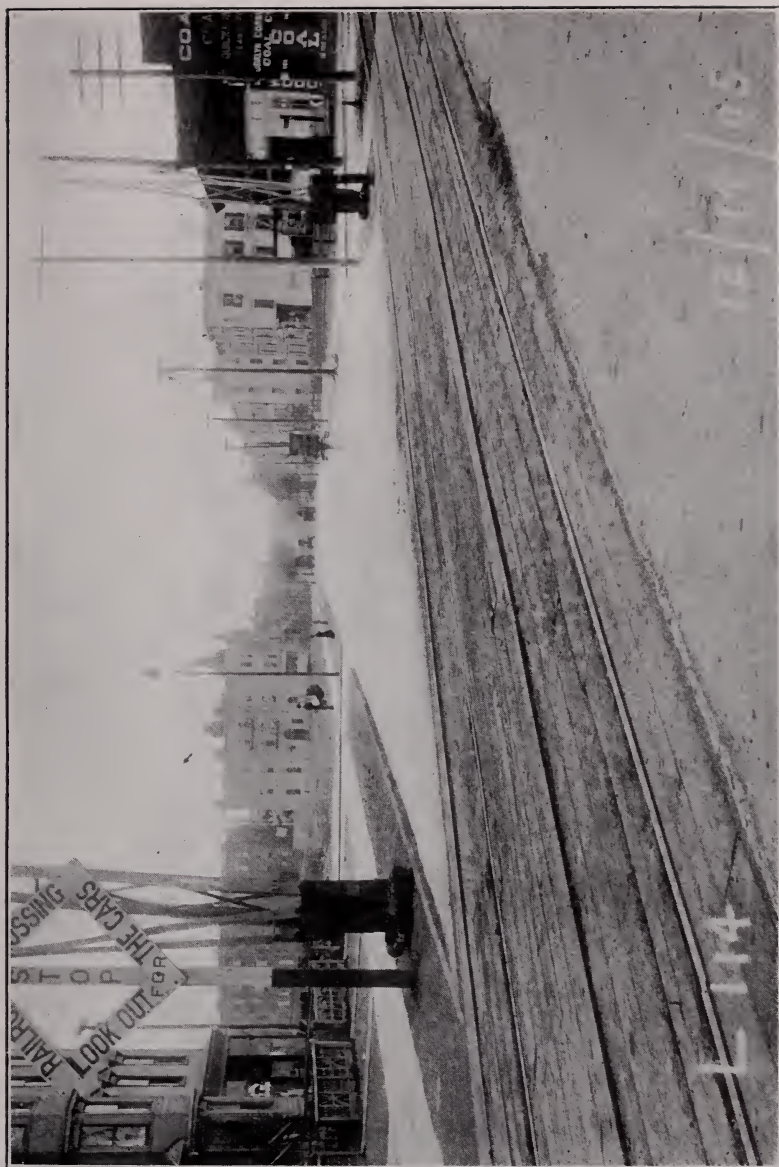
Tunnel showing various phases of construction. This Tunnel is constructed on a right-of-way provided by the Long Island Railroad and is the most important construction work of the Commission. For detail description see page 51.



Vesta Avenue, East New York Long Island Railroad on the Avenue crossing Fulton Street, and in background crossing Broadway.



Vesta Avenue—Same as preceding picture. Tracks in new location in Tunnel.



Bushwick Avenue—Long Island Railroad Crossing—near East New York.



Bushwick Avenue—Same as preceding picture—tracks in Tunnel.

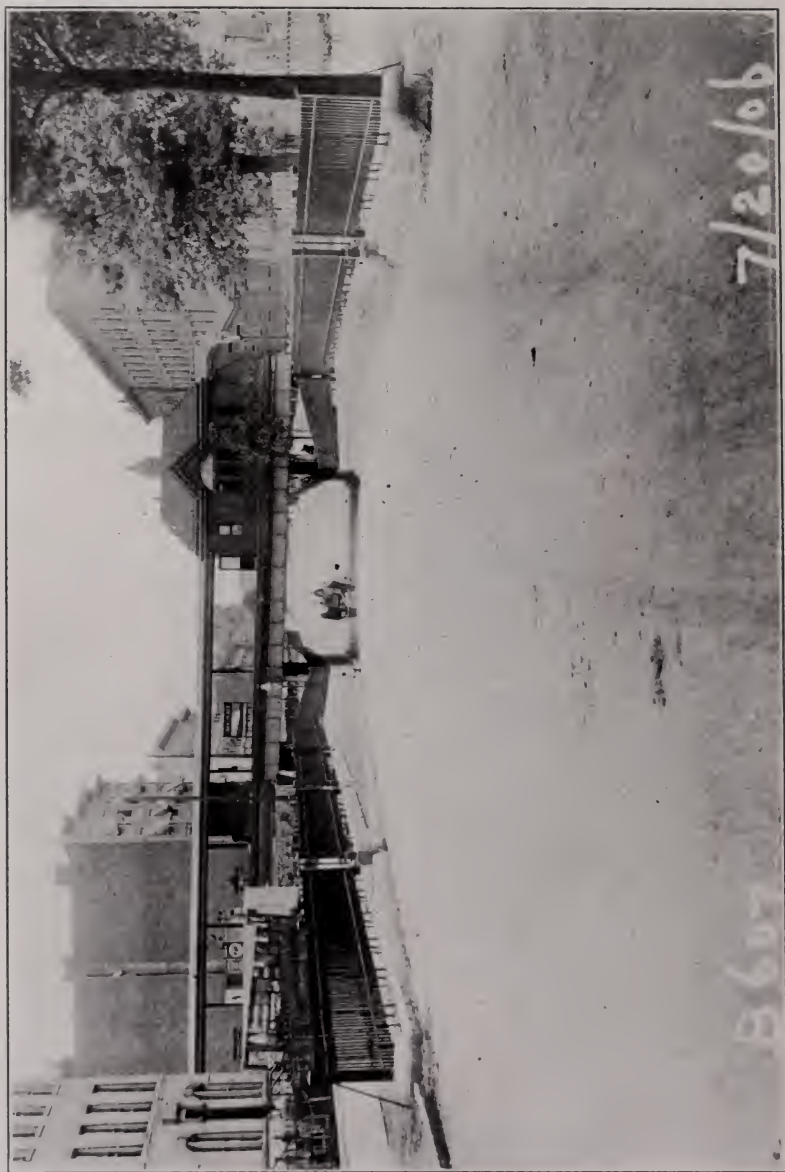


North Portal of Tunnel.

The photo reproductions given on the following pages show a few of the changes made on the Brighton Beach Railroad.



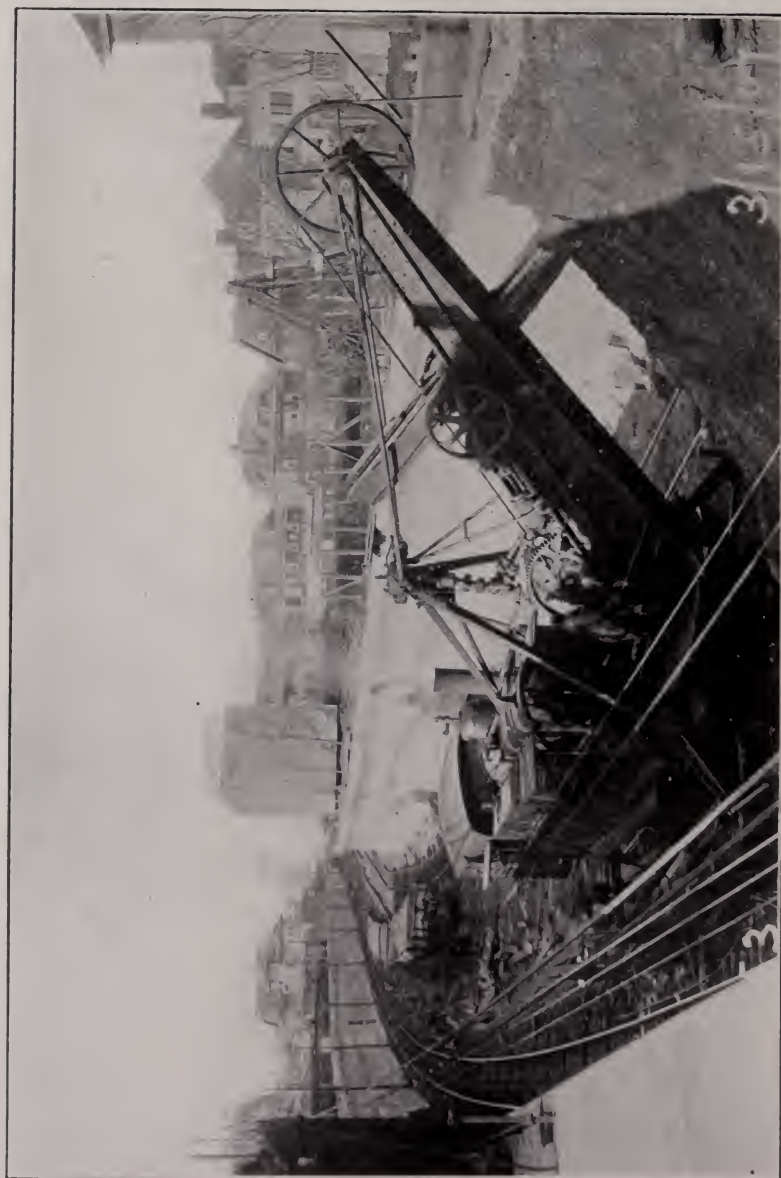
Park Place showing Brighton Beach Railroad Crossing.



Park Place depressed. Railroad elevated.



Foot bridge at Albemarle Road. Brighton Beach Railroad depressed.



Excavating Brighton Beach Railroad, North of Beverly Road.



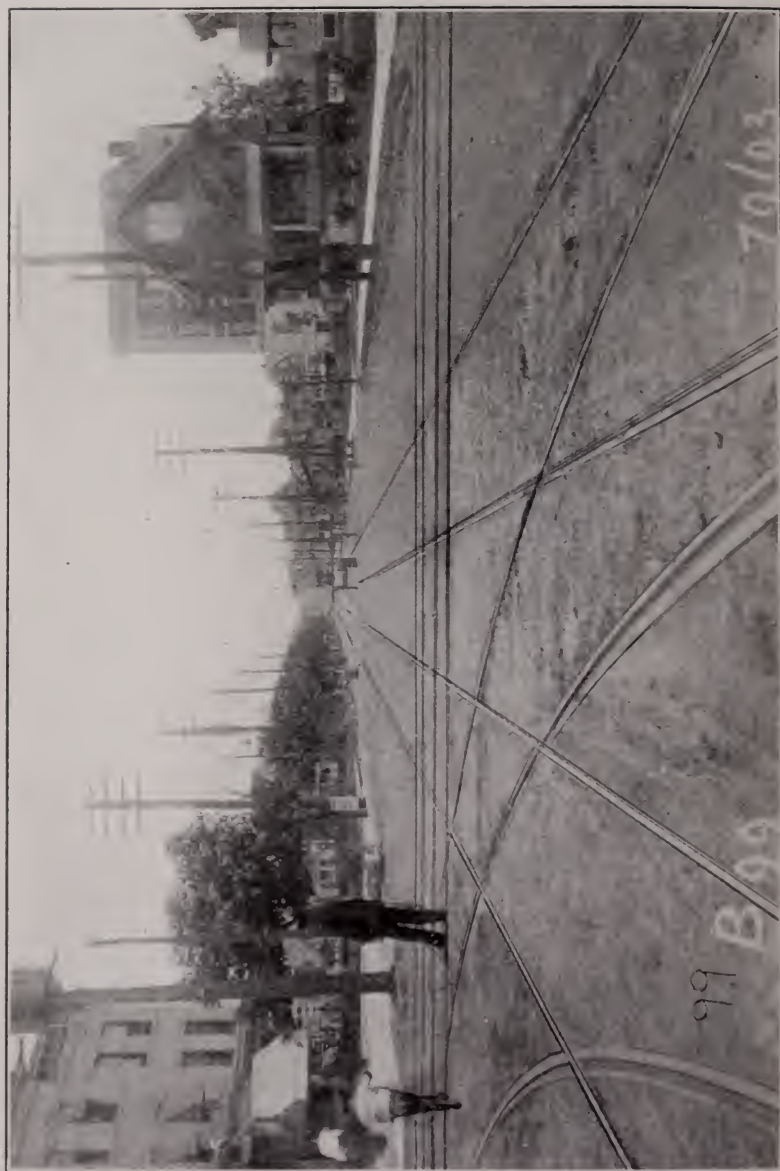
Beverly Road at Brighton Beach Railroad Crossing before change.



Beverly Road same point as preceding picture. Railroad underneath—see following picture.



Brighton Beach Railroad depressed at Beverly Road. Bridge carries street and station.



Avenue C, showing Brighton Beach Railroad Crossing, 1903.



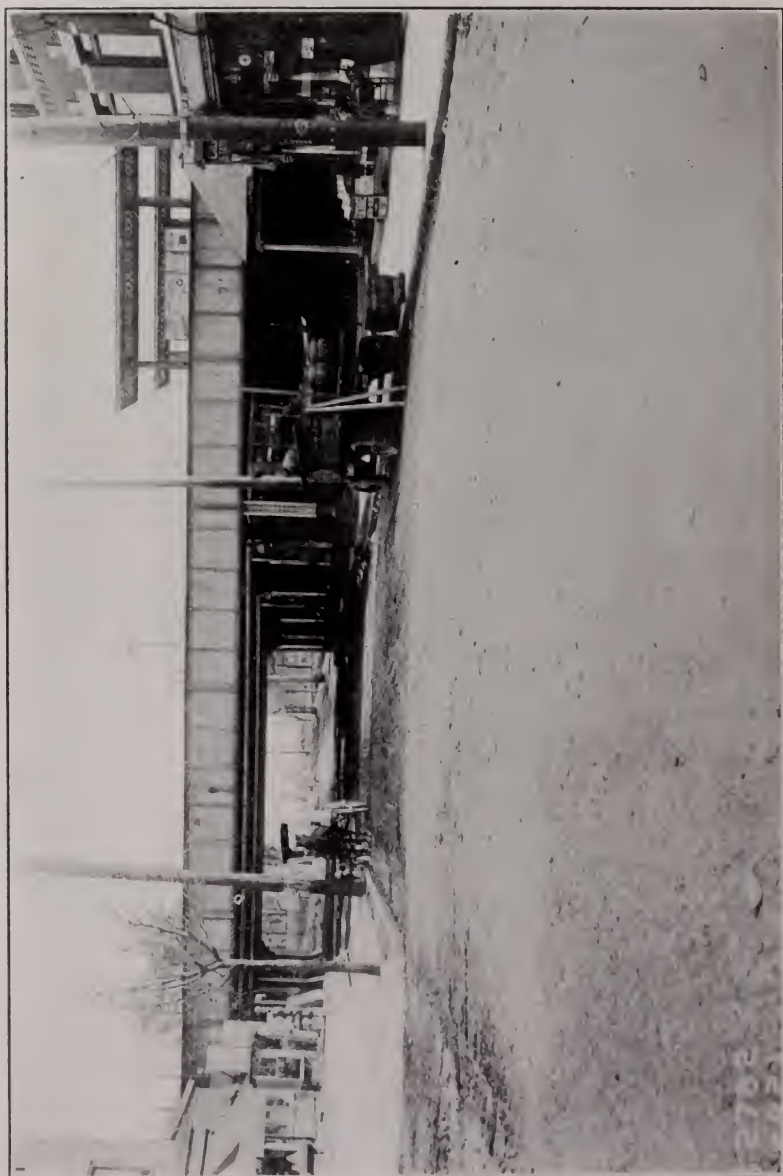
Avenue C Railroad depressed. Station, and stairway to trains, on left. 1912. Note development of neighborhood since preceding picture.



Construction work Brighton Beach Railroad, North of Ditmas Avenue.



Kings Highway at Brighton Beach Railroad Crossing before change. Manhattan Beach Railroad in distance.



Kings Highway (same as preceding picture.) Manhattan Beach Railroad removed to alongside of Brighton Beach Railroad and both elevated.



Neptune Avenue, at Coney Island Creek, and Brighton Beach Railroad Crossing before change.



Neptune Avenue (same location as preceding picture.) Brighton Beach Railroad on bridge. Manhattan Beach Railroad on bridge in the distance (also elevated by this Commission.)

Car Float Ferry to Greenville, N.J.

NEW YORK BAY

BAY RIDGE

MANHATTAN BEACH JUNCTION

PARKVILLE

VANDERVEER PARK

PAERDEGAT

KOWENHOVEN

UTICA

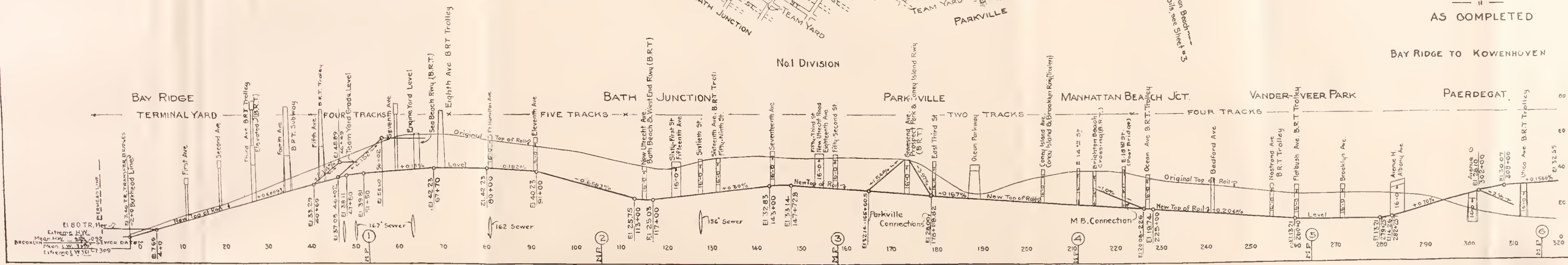
RALPH

Scale 1"=1600 FT.

March, 1918

BAY RIDGE IMPROVEMENT LONG ISLAND RAILROAD AS COMPLETED

BAY RIDGE TO KOWENHOVEN





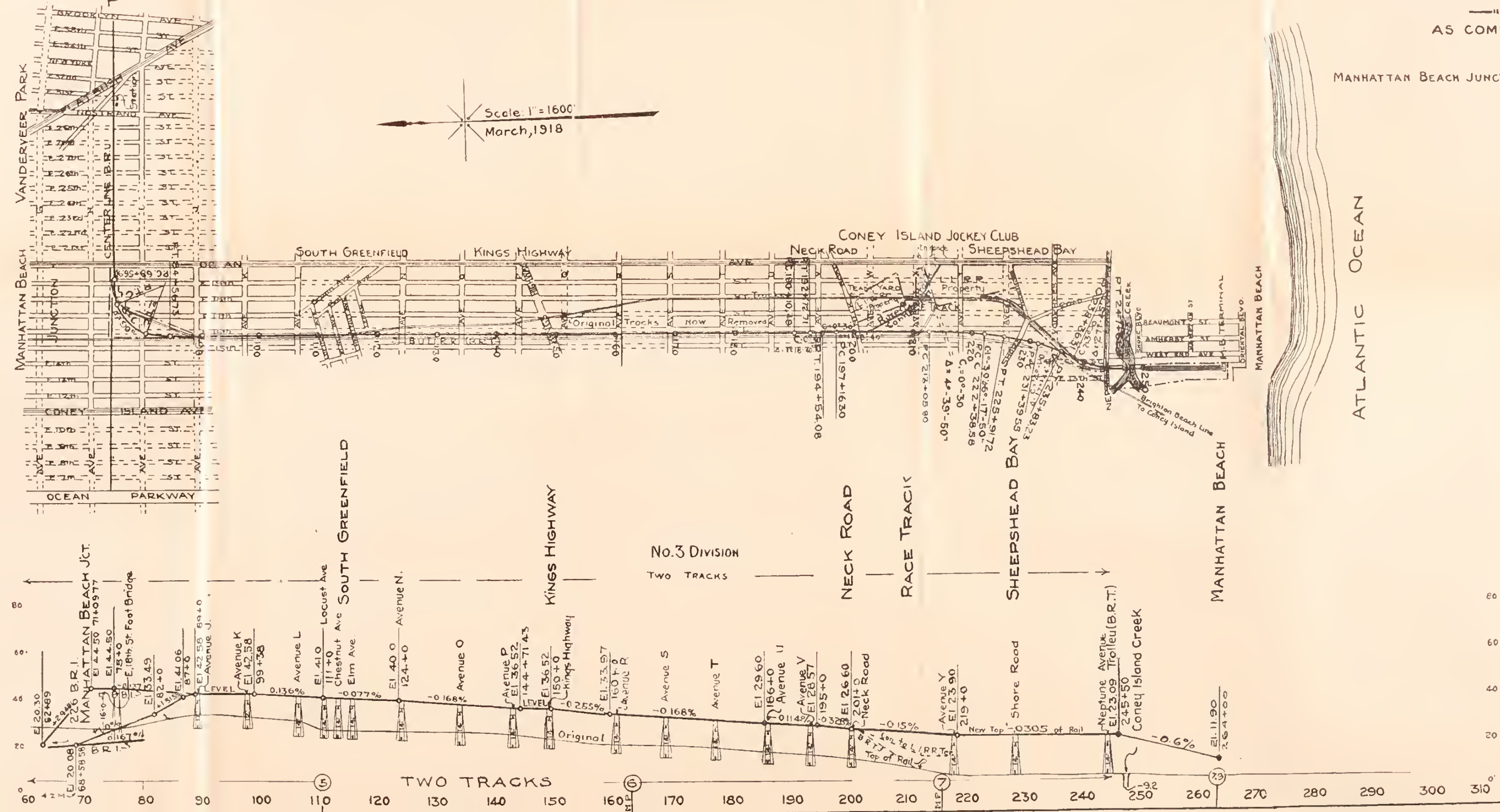
BAY RIDGE IMPROVEMENT

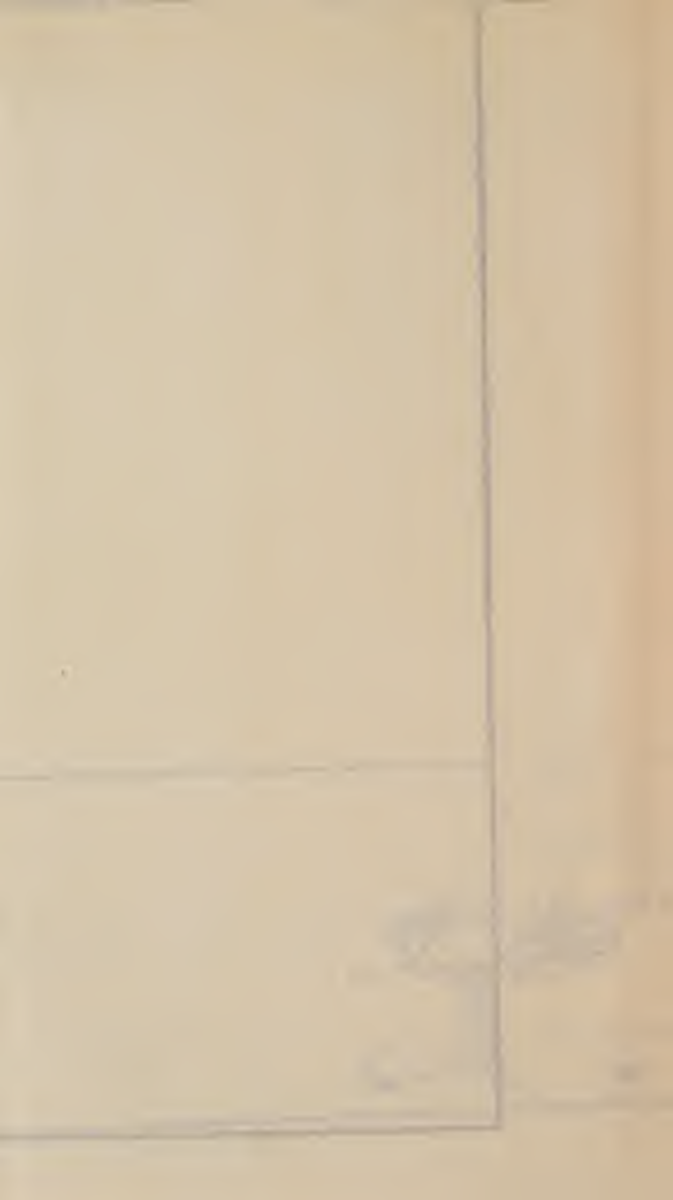
LONG ISLAND RAILROAD

AS COMPLETED



MANHATTAN BEACH JUNCTION TO MANHATTAN BEACH





BAY RIDGE IMPROVEMENT
LONG ISLAND RAILROAD
—||—
AS COMPLETED

MANHATTAN BEACH JUNCTION TO MANHATTAN BEACH

ATLANTIC OCEAN

